Data Communications Products

AST-5250FT/11-A™

AST RESEARCH INC.

User's Manual

AST-5250FT/11-A
5250 File Transfer Software
for the
IBM Personal Computer,
PC Portable, PC-XT, PC-AT
and
Other Compatible Systems

User's Manual
000702-001A
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Changes are periodically made to the information contained in this manual; these changes will be incorporated into new editions.

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

APPENDICES

FIGURES

TABLE OF CONTENTS
(Continued)

TABLES

PREFACE

Before you begin using your AST-5250FT/11-A package, be sure that you received the following items in the package:

- Master 5-1/4″ floppy diskette (supplied on the emulation diskette).
- Master 8″ floppy diskette or 5-1/4″ for System/36 PC.
- User's Manual.
- Operator's Manual.

The installation and use of the AST-5250FT/11-A file transfer software should go smoothly. However, if you have a problem after you have completed all instructions, call your dealer or AST Technical Support.

Before calling your dealer or AST Technical Support, please complete the checklist given in Appendix C so that all pertinent information is available. Having the information available saves time and helps your dealer or the AST support personnel identify the nature of the problem.

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SECTION 1
INTRODUCTION

The AST-5250FT/11-A ™ software package included with your AST-5251/11 ™ product gives you the ability to transfer files bidirectionally between your IBM Personal Computer (PC) and your IBM System/34/36/38 ® (hereafter referred to as System/3X).

This easy-to-use software allows you to: (1) bring data from the System/3X to your PC; (2) send data from your PC to the System/3X; and (3) print data from the System/3X on a printer attached to your PC.

Because AST-5250FT/11-A is one of the fastest file transfer facilities available, vital information for your application can be quickly retrieved from the System/3X and automatically converted into the file format you specify. Whether the information you need is to be used in a Lotus 1-2-3 ™ spreadsheet or edited with WordStar ™, the data transferred to your PC is ready for use by the application when it is received. You need not go through the extra conversion step, it's done automatically.

AST-5250FT/11-A is a combination of PC and System/3X software. That is, you use one program on your PC and the System/3X operator installs a separate AST-5250FT/11-A program on the System/3X. The two programs interact together whenever you initiate a file transfer operation.

Because AST-5250FT/11-A was designed as a "joint venture" between the PC and the System/3X, it offers maximum benefits and functionality to both the PC user and the System/3X operations staff. Easy-to-learn and use, this combination software was conceived to fill real needs of both the PC user and the System/3X operating personnel. The documentation provided with this package consists of this PC User's Manual and an Operator's Manual (000703-001).

The PC user needs:

- To "download" data from the System/3X to the PC.
- To "upload" data from the PC to the System/3X.
- To receive the data in a format that is directly usable by the application.
- To print data from the System/3X on the local PC printer.
- To be able to learn and use the procedures easily.

On the other hand, the System/3X operations personnel need:

- A turnkey system that requires no additional programming.
- Simple, easy-to-learn configuration procedures.
- Minimum degradation of the job load on the System/3X.
- Control over the data base security.
- The ability to use the PC's printers.
- The ability to use the PC for host software development.

AST-5250FT/11-A was designed to fill both sets of needs while maintaining speed, flexibility and user friendliness

Although AST-5250FT/11-A provides exceptional capability, AST also offers an enhanced version — AST-5250FT/11-B — for more sophisticated uses of file transfer.

The following features are some of the powerful capabilities offered in the optional software: (1) comprehensive data base access with file chaining, allowing multiple file access in a single download; (2) a data query language at each linked PC, permitting specific data field and record selection; (3) additional security features, including file, record, and individual field protection; (4) full System/3X and PC printer sharing; (5) storage of PC files on the System/3X; and (6) "automatic" down- or uploading of multiple data files or library members from a control file.

If you require these additional features, contact your AST dealer or AST for information about the AST-5250FT/11-B. Because the enhanced version is a superset of AST-5250FT/11-A, the software packages are fully compatible.

The following subsection lists the features of AST-5250FT/11-A and AST-5250FT/11-B, and presents a comparison of the capabilities of the two packages.

1.1 AST-5250FT/11-A Features

The following features are available with AST-5250FT/11-A:

- Allows the user to select data from the System/3X data base and store it on a PC diskette file in the format needed for a specific application.

- Allows the user to copy a library member (source data or procedure) from the System/3X to a PC diskette for editing and to then replace or add the edited file in the System/3X library.

- Allows the user to store data in a System/3X file for normal System/3X processing (data entry applications).

  Data entry applications with full data validation and batch balancing/reporting can be used to capture data at the source and then transfer the data to the System/3X for normal processing.

- Allows the user to retrieve print files from the System/3X to a PC diskette in a format for direct printing on the PC printer.

- Provides the user with a menu from which to select functions and asks specific questions that prompt for required parameters.

- Provides the user with full error reporting and activity status messages.

The features of AST-5250FT/11-B are described in the following paragraphs.

- *Comprehensive Data Base Access* — Permits comprehenive access to your host data base without RPG programming or reorganization of the data files. Regardless of which applications are running on the System/3X, AST-5250FT/11-B can download the data.

  The downloading is accomplished by "views" (logical files). By initially defining views at the host, a linked PC can access: (1) an entire file; (2) a portion of a file; (3) fields from multiple files (up to 16 files); or (4) a selection of records from a single file. Any library member, either source or procedure, may also be downloaded to the PC.

- *Data Query Language* — Through the data query language, each linked PC can access only the information needed for processing. The query enables the following: (1) selection of specific fields; (2) selection of records based on record key range (data content or relative record number); (3) selection of those records that satisfy specific relational selection criteria; or (4) any combination of the above.

- *Security* — Provides extensive security tools to prevent access of any information deemed sensitive by System/3X personnel.

  All PC users are assigned a user ID and password. Also, supplemental security measures can be implemented to lock PC users from: (1) specific files; (2) specific records within files; or (3) specific fields within files.

- *Printer Sharing* — Permits print files to be sent from a linked PC to the host system specified printer spool queue for printing with numerous print formatting options. Host print files may also be downloaded and printed at PC printers. The printing facilities can be shared among all users of AST-5250FT/11-B.

- *Image Files* — Allows linked PC users to share a portion of the System/3X disk to store PC files. Through image files, PC users can: (1) extend the PC's disk storage; (2) share data files among users; (3) distribute software; and (4) send messages between PCs. The security measures allow certain users and groups to be excluded from accessing owner image files.

- *Automatic File Transfers* — Allows multiple down- or upload selection criteria strings (or file transfer "jobs") to be stored in a control file. When the control file is called at the PC, all jobs are automatically transferred and translated. Operator intervention is not required between data transfer; thus, users can run multiple data transfers whenever convenient.

Table 1-1 summarizes the features of AST-5250FT/11-A and AST-5250FT/11-B.

Table 1-1. Features of AST-5250FT/11-A and AST-5250FT/11-B.

Program Capability	AST-5250FT/11-A	AST-5250FT/11-B
Bidirectional File Transfer.	X	X
Format Conversions:		
System3/X = EBCDIC, Packed, Binary, Alphanumeric, Zoned Decimal.		
PC = ASCII, Basic Sequential, Basic Random, DIF, WKS, WRK, DOS Print Image, Baby 34/36, Binary Image.	X	X
Security Features:		
User ID and Password.	X	X
Read-/Write-only Data File Protection.	X	X
File, Record, and Field Protection.		X
Group Code Protection.		X
File Chaining and Record Selection:		
Chain up to 16 Unique Files.		X
Select Specific Fields Within a Record.		X
Select Specific Key Ranges in a File.		X
Select Specific Records Based on Field Content.		X
PC Image File Features:		
Storage of PC Data on System/3X Hard Disk (with full security).		X
Print File Access and Translation:		
Print File Download From System/3X.	X	X
Direct File Spool From PC to System/3X Printer.		X
Message Facility.		X
Activity Log of Transactions.		X
Control File Version for "Automatic" Downloading/ Uploading of Multiple Jobs.	X	

1.2 Operating Requirements

AST-5250FT/11-A requires that your PC has the AST- 5251/11 hardware and software installed and operational. Before you use the file transfer software, be sure that the twinax connection to the System/3X is operating properly.

Also, before you can use AST-5250FT/11-A, you must work with the System/3X operations staff to define the "views" of the data base needed to support your applications. (See Section 2.1.1.)

After the views are defined, your System/3X operator will give you a report of the views as described in Section 2.1.1. Also, the System/3X personnel will assign you a user ID code (or codes) and passwords. You must have one pair to sign-on to the System/3X and a second pair to sign-on to AST-5250FT/11-A. Both sets are required in order for you to sign-on to the System/3X data base. Your password(s) is secret and should not be made known to other users. (See Section 2.1.2.)

Before you use AST-5250FT/11-A, read this User's Manual. Be sure to complete all steps required in Section 2.1 before you try to initiate a file transfer operation.

1.3 How To Use This Manual

This manual explains how to use AST-5250FT/11-A on your PC. A brief explanation of the interrelationship between the PC and the System/3X software is presented so that you will understand the setup process required before you use AST-5250FT/11-A.

The AST-5250FT/11-A Operator's Manual (000703-001) must be used by the System/3X operator or systems manager to install and configure the System/3X software before you can use the PC for file transfers. Be sure that the Operator's Manual and AST-5250FT/11-A 8" or 5 1/4" (for System/36/PC) master floppy diskette are given to the appropriate systems person at your site.

This manual assumes that you are familiar with the PC and the Disk Operating System (DOS). Also, it assumes that you are a familiar user of the System/3X.

1.3.1 Format Notations

The following conventions are used in this manual:

- **Boldface** indicates information that you must enter or a key you must press. For example, <**Enter**> means to press the Enter/Carriage Return key.
- A notation such as <**Ctrl**>-<**Alt**> means to press the <**Ctrl**> and <**Alt**> keys simultaneously.
- Square brackets ([ ]) indicate an optional term that you can include or omit at your own discretion. The brackets are not part of the input.
- System prompts and messages are shown in color.

1.3.2 Related Documentation

This manual assumes that you are familiar with the operation of the IBM PC under PC-DOS and with the functions and operation of the IBM 5251 Model 11 Display Station as it relates to the particular host system to be used. However, the following publications of the IBM Corporation may be useful to you for reference:

For the IBM PC:

- *Guide to Operations.*
- *Disk Operating System.*
- *Technical Reference Guide.*
- *File Support Utility User's/Programmer's Guide.* (For Virtual Disk Interface usage, the manual numbers are the following: System/34 SC21-7993-0, System/36 SC21-7992-1, and System/38 SC21-9059-1.)

- *PC-AT Installation and Setup Manual.*
- *AST-5251/11 User's Manual.*

1.3.3 Manual Outline

The following outline describes the sections contained this manual.

SECTION 1. INTRODUCTION
Explains the AST-5250FT/11-A file transfer capabilities and gives the operating requirements.

SECTION 2. GETTING STARTED
Explains the tasks to be completed for setting up the System/3X and PC software. Discusses the interrelationship of the two pieces of software — one for the PC and one for the System/3X. Guides you through an initial file transfer session.

SECTION 3. AST-5250FT/11-A FUNCTIONS
Describes the various functions available with AST-5250FT/11-A: data base, print, and miscellaneous functions.

SECTION 4. APPLICATIONS FILE FORMATS
Discusses the various file formats supported by AST-5250FT/11-A.

SECTION 5. VIRTUAL DISK INTERFACE
Describes the AST Virtual Disk Interface (AST-VDI) software.

APPENDIX A. ERROR MESSAGES
Lists and explains the error messages generated by AST-5250FT/11-A.

APPENDIX B. ASCII CHARACTER CODE VALUES
Lists the ASCII code values for various characters.

APPENDIX C. CHECKLIST — PROBLEM REPORTING
Provides a checklist of information needed in case a problem must be reported.

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SECTION 2

GETTING STARTED

This section explains the tasks to be completed before you use AST-5250FT/11-A for a file transfer operation and then guides you through an initial session once the preparation is complete. The preparation tasks involve working with the System/3X operations staff to set up "views" of the data you need to access on the System/3X and using your AST-5250FT/11-A Master diskette to make working copies to use on your PC.

Section 2.2 explains how to initiate a file transfer operation and guides you through a quick "sample" session. That section is not intended to explain the various functions in detail but rather is intended to show you the power and ease of using AST-5250FT/11-A. Section 3 describes the functions and Section 4 discusses the various file formats supported by AST-5250FT/11-A.

2.1 Before You Use AST-5250FT/11-A

Your AST-5250FT/11-A product consists of two floppy diskettes — a 5-1/4" diskette which contains the PC software (supplied on the emulation diskette) and an 8" diskette which contains the System/3X software — and two manuals — this PC User's Manual and an Operator's Manual. *The 8" or 5 1/4" (for System/36/PC) diskette and Operator's Manual should be given to your systems manager as soon as you receive your AST-5251/11 (and thus, AST-5250FT/11-A) product.*

You will work closely with the systems person to define the data that you need to transfer between the System/3X and your PC. Also, you will need to get user ID codes and passwords from the systems personnel so that you can access the System/3X data base. The log-on information (user ID and passwords) and definitions of the data you need must be obtained before you initiate a file transfer operation.

2.1.1 Views

You will be allowed to access data on the System/3X *only* as it is defined. The data you need is defined in a *view*. A view is a *logical* file (not a physical file) that is defined to the System/3X through the AST-5250FT/11-A System/3X software, which the systems manager installs on the System/3X. The operator or systems manager must use that software to define the views. Each view is given a name so that you can access it.

A view may be one of the following: (1) a total physical file; (2) a portion of a physical file which is made up of selected fields from each record; or (3) a library member. A "field" is a defined unit (or portion) of a record (or line) in a physical file. The view may specify a library, in which case you can access any source or procedure member within the library.

You should explain to the appropriate systems person what specific data you need to access. That person will then set up the views based on your security privileges.

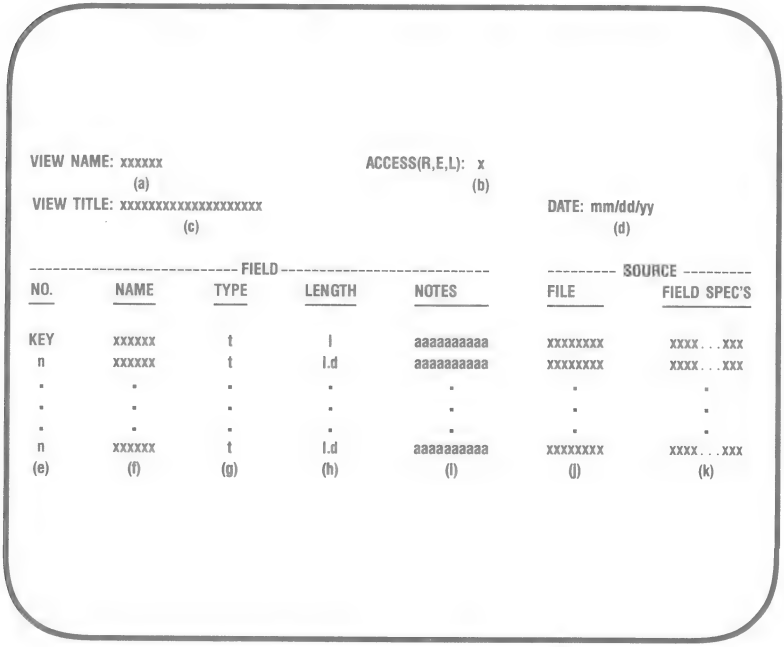
A total of 128 views can be defined; the number of views to which you have access will be based on your need for information.

Once the systems person has defined your views, you will get a report for each view which provides you with information about the view. Once your views are defined, you can choose to list the directory of available views on your screen when you use AST-5250FT/11-A.

The view report serves two purposes:

- It defines to the user the format or fields of the logical record corresponding to the view.
- It relates the fields of the logical record to specific (source) data files and fields for the System/3X operations staff.

Figure 2-1 illustrates the information contained in a view report. The alphabetical characters in parentheses in the figure correspond to the notes listed after the figure.



VIEW NAME: xxxxxx (a) ACCESS(R,E,L): x (b)

VIEW TITLE: xxxxxxxxxxxxxxxxxxxx (c) DATE: mm/dd/yy (d)

FIELD					SOURCE	
NO.	NAME	TYPE	LENGTH	NOTES	FILE	FIELD SPEC'S
KEY	xxxxxx	t	l	aaaaaaaaaa	xxxxxxxx	xxxx . . . xxx
n	xxxxxx	t	l.d	aaaaaaaaaa	xxxxxxxx	xxxx . . . xxx
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
n	xxxxxx	t	l.d	aaaaaaaaaa	xxxxxxxx	xxxx . . . xxx
(e)	(f)	(g)	(h)	(i)	(j)	(k)

Figure 2-1. View Report Format.

NOTES TO FIGURE 2-1.

View identification data:

(a) The name of the view (1 to 6 characters).

(b) The view access type: R = Read Only, E = Enter Only, or L = Library Reference.

(c) The view title: *for System/34/36* 1 to 20 characters, *for System/38* 1 to 50 characters.

(d) The date that the view was last revised in the form — month/day/year — where each is two numeric digits.

Logical record data:

(e) The field number or "KEY" for the record key.

Each logical file contains a key that is defined by the first field listed and labeled KEY. The key may or may not be a field within the logical record. If it is, it will be listed again in order by its logical field number.

(f) The field name (if specified).

(g) The field type where A = Alphanumeric, N = Numeric.

(h) For type A (alphanumeric) fields, the maximum field length.

For type N (numeric) fields, the maximum number of digits, a decimal point, and the number of decimal digits.

The length of numeric fields has the form l.d; where l represents the total maximum digits and where d is the number of digits following the decimal point. A few examples are given in Table 2-1.

Table 2-1. Examples of Numeric Field Lengths.

Length	Number Format
6.2	nnnn.nn
4.0	nnnn
4.4	.nnnn

For a numeric field, the display/entry field size must be equal to the maximum number of digits plus one for the decimal point (if any) and one for a negative sign (if allowed).

(i) Notes or comments can be added in this area.

The areas labeled (j) and (k) are the relation of logical field to source file and are of concern only to the System/3X operations staff.

(j) The name of the System/3X file from which the data is extracted.

(k) The field specifications that define the source field.

Once you receive the view reports, if you have any questions regarding the views as defined, discuss them with the appropriate System/3X person.

2.1.2 Security

The System/3X operations staff will define your views based on the files and data to which you are allowed access. The user ID and passwords assigned to you by the systems operations personnel are defined to the AST-5250FT/11-A software so it can check to determine whether or not you are a valid user when you log-on to perform a file transfer operation.

When you use AST-5250FT/11-A PC software to access the System/3X data base, you will be prompted for your user ID and password.

In most cases, the user ID assigned to you will be the same one that you use to log-on to the system in order to run the AST-5251/11 emulation software. Your password for the two programs — AST-5251/11 and AST-5250FT/11-A — may also be the same or may be two different character combinations. Either way, the passwords are the "secret" words which are not displayed on the screen and which must be entered correctly before you will be allowed access to the System/3X.

Once your password(s) is assigned, remember it and do not allow any other user to know it.

2.2 Initiating A File Transfer

A file transfer can only be performed when your PC is actively logged on to the System/3X using the AST-5251/11 emulation software. File transfer is initiated under DOS with the emulation software as the background task. That is, you use the hot key sequence to switch to DOS as the active foreground task before you initiate the ASTFT11 program. (If you have any questions regarding operation of the emulation software, refer to the *AST-5251/11 User's Manual*, 000196-001.)

To load and execute the program, enter (after the DOS prompt):

ASTFT11 [/SSN = n] [/ACT = b[-e]]

where *n* is the emulation session number (default is one).

b is the Activation Menu Option Number.

e is the Termination Menu Option Number.

If you specify the ACT (Activation) parameters, the software selects option *b* from the current menu before initiating the file transfer, and selects option *e* when it terminates the file transfer.

For System/38 users: If you include *b* you must also include *e*.

Invalid parameters are ignored.

If you specify a session number greater than the highest one provided, the system assumes the highest numbered session provided. For example, if only two sessions are provided, and you specify SSN = 4, the system uses session 2.

A menu appears that prompts for information, lists the available functions, and provides status information as the file transfer progresses.

This subsection explains the basic operation and guides you through a quick sample session.

NOTE

The ASTFT11 program has a parameter that might be used depending on which menu is displayed in the emulation mode.

If the AST-5250FT/11-A Activation menu is active, the command **ASTFT11/ACT = 1** should be used to execute the File Transfer. (See Section 2.4 System/38 Initialization, of the AST-5250FT/11-A Operator's Manual, for further detail).

2.2.1 Basic Operation

After you enter ASTFT11 and press <**Enter**> to execute the program, the following message briefly appears while the system is being configured and while the link with the System/3X is established:

AST-5250 File Transfer Activation Procedure is being executed
Please stand by.....

Once the program initialization is complete, the menu shown in Figure 2-2 appears on the screen.

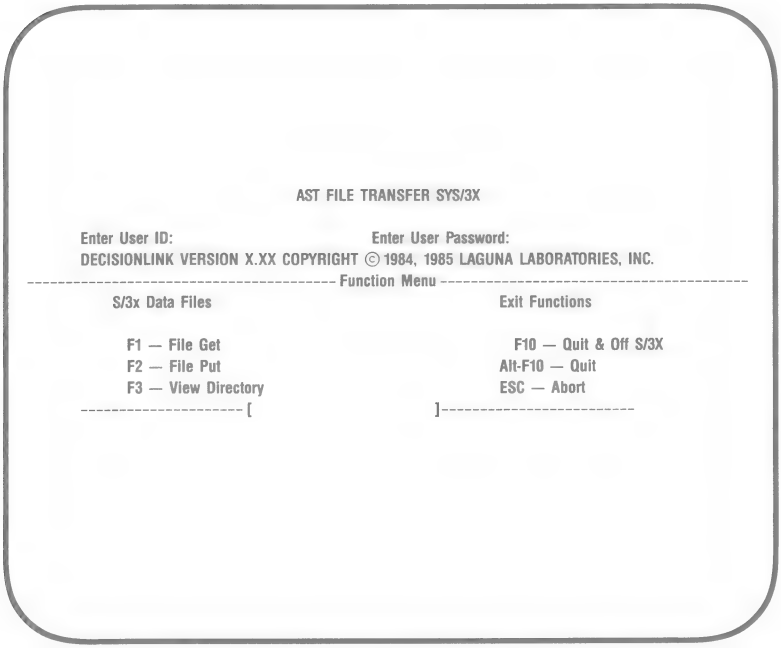


Figure 2-2. AST-5250FT/11-A Main Menu.

This menu requires you to input information and choose the function that you wish to use. Some functions prompt for information and display additional status information as the function is being performed. Each of the available functions is described in detail in Section 3.

The menu screen is divided into three sections: top, middle, and bottom. Each division serves a specific purpose. The top portion asks for log-on information and presents information to you regarding the software and log-on status.

The middle portion lists the available functions showing the function key to press for the desired function. Prompts asking for information (parameters) for a function are displayed on

the bottom portion. Also, the bottom portion is used to show status information as a data transfer function (not a directory function) progresses.

TOP PORTION

The first information required from you is your user ID. That information should be entered in the field in the upper left position. Any field requiring you to enter information is shown in reverse video. After you type the correct characters for your user ID, press <**Enter**>.

If you press <**Enter**> without typing in the characters of your user ID (null ID), ASTFT11 aborts and control returns to DOS.

If you enter an invalid (erroneous) ID, the following error message appears at the bottom of the screen highlighted in reverse video:

10 Invalid User Id ← Press any key to continue

If you receive this message, you may retype the correct characters. The software allows you to try three times for the correct user ID; if the ID is not correct on the third try, ASTFT11 aborts and control returns to DOS.

Once the user ID is correctly entered, the password field is highlighted. You type in the password and press <**Enter**>. As you type the characters, they will not appear on your screen. This invisible keying maintains the security of your password.

If you make a mistake in keying the password, the error message — 10 Invalid User Password — appears, and you are allowed three tries before the program aborts.

Once you have correctly entered the user ID and password, a message from the System/3X is displayed across the center of the top portion of the menu indicating that log-on was successful.

MIDDLE PORTION

The functions available to you are listed on the middle portion of the menu. A function is selected by pressing the corresponding function key. (The function keys are the two, leftmost vertical rows of PC keys, labeled F1 through F10.) The following blinking message appears in the center bracketed ([ ]) area when a function key selection is expected.

Press Desired Function Key

When a function key is pressed, the title of the function is displayed in the center bracketed ([ ]) area immediately below the function list.

If you do not select a function within a five-minute period, the program signs-off the System/3X so that no other user can access the system under your sign-on.

You may press <**Esc**> to abort an entry and return to the prior activity.

BOTTOM PORTION

The bottom portion of the screen is used to display prompts and status information. Whenever you select a function, certain parameters are required by the program in order to correctly complete the operation. These prompts appear on the bottom portion of the menu. The bottom two lines of the screen are used to display error and information messages.

Some functions (for example, F3 — View Directory) display a new screen; when the use of the new screen is complete, the original display is restored.

After any requested parameters have been entered and the function execution begins, the following message appears:

Session being established — please wait

Once an operation begins, one of the following formats is displayed on the bottom portion of the screen:

RECORDS RECEIVED nnnnn Press ESC to Abort

RECORDS TRANSMITTED nnnnn Press ESC to Abort

where either RECEIVED or TRANSMITTED is inserted based on the type of operation; and where nnnnn is the current count of the number of records transferred.

The file transfer function can be stopped by pressing <**Esc**>; however, any data already transferred is lost.

Once an operation completes successfully, the following message is displayed:

COMPLETE sssss Seconds Press any key to continue

where sssss is the elapsed time of the transfer operation in seconds.

The following subsections describe standard operation considerations — for example, how to enter data in a field or correct erroneous keystrokes.

DATA KEYING/EDITING

Any field requesting information is highlighted by reverse video (that is, a light rectangle on a dark background) to show the maximum field length. Once the entry is completed, the field is redisplayed in normal intensity. The cursor is placed within the field where the next character keyed will be placed.

All entries are completed by pressing <**Enter**>.

When entering data you may edit your responses by using the keys described in the following paragraphs.

4 ←	Pressing the left arrow key <←> on the numeric key pad (right side of the keyboard) moves the cursor one position to the left within the field. Moving past the start of the field is not allowed.
6 →	Pressing the right arrow key <→> on the numeric key pad (right side of the keyboard) moves the cursor one position to the right within the field. Moving past the next open character position or past the end of the field are not allowed.
1 End	Pressing <**End**> on the End numeric key pad (right side of the keyboard) moves the cursor to the end of the data in the field. Any characters typed from that position are added to the end of the existing data.
Ctrl 1 End	Pressing <**Ctrl**>-<**End**> erases input starting with the current cursor position to the field end.
. Del	Pressing <**Del**> erases the Del character at the current cursor position. Characters to the right of the cursor are shifted left.
0 Ins	Pressing <**Ins**> switches Ins back and forth between insert mode and overwrite mode. That is, the key "toggles" between insert being ON and OFF. With insert mode ON, the cursor is blinking and covers the lower half of the character position. When insert mode is OFF, any character typed replaces (or overwrites) existing characters in the field. When insert mode is ON, typed characters are inserted at the current cursor position; after each keystroke, the cursor moves one position to the right.

←	Pressing the backspace key on the top row of PC keys deletes the character immediately to the left of the cursor. (This character is generally the last character typed.) Pressing this key at the beginning of a field is ignored.
Ctrl 4 ←	Pressing <**Ctrl**>-<←> places the cursor at the beginning of the field if it is not already positioned there. If the cursor is positioned at the beginning of the field, this key sequence moves the cursor to the beginning of the prior field if one exists.

The numeric keypad keys are used as editing keys unless you press <**Shift**> while typing the numbers.

ENTRY ERRORS

If you enter an illegal character in a field or enter more or fewer characters than allowed, an audible beep (alarm) is sounded.

Also, when you enter characters that are detected as an error, an error message is displayed at the bottom of the screen.

Appendix A lists and explains the possible error messages generated by ASTFT11.

DISKETTE FILE SPECIFICATION

Most functions require you to specify a diskette or disk file that is to be used for reading or writing the data. When this parameter is required, the following message is displayed on the bottom portion of the menu:

PC File: x:

The default or active drive id "x" is initially displayed and the cursor positioned following the drive id so that you can enter a file specification.

The file specification is in the form [path][file], where path is a path of directory names (DOS 2.0 and above) and file is a file name with optional extension.

If no path is specified, the current directory is used. If a path is entered, it must be the "full" path name beginning and ending with a " \ " character (for example, PC File: C: \ WS \ DOC \ ). The root directory is specificed by a single " \ " character.

When a path is entered, it becomes the current directory for the remainder of the session or until respecified.

The file name is, of course, governed by DOS constraints regarding length and special characters.

You may not use the following file names, which are reserved for the operating system: *CON, AUX, COM1 and COM2.*

If you want to specify another drive ID, move the cursor back over the drive letter (in this case, d) and enter the selected drive letter. Reposition the cursor past the colon to enter the file name.

During this file transfer session, the last drive specified becomes the new default drive. That is, if you change the default of A: to B: and complete a file transfer, then initiate a second operation, the second time the prompt appears the default will be B: (until you either select a new drive specification or reload ASTFT11).

If the drive specified is invalid, the cursor is repositioned for entry of a new drive. If an invalid path is specified, the cursor is positioned at the first " \ " character of the path.

On program termination the initial default drive and directory are restored.

DOS DIRECTORY DISPLAY

If you press <**Enter**> without entering a file name in response to the file specification prompt, a directory of all files on the current drive and directory is displayed. You then press any key to continue. By changing the drive specification and then pressing <**Enter**>, you can view the directory of any drive.

For example, if you press <**Enter**> after the PC File: C: prompt, the current directory on drive C (all files in that directory) is displayed.

If you press <**Enter**> after the PC File:A: \ WS \ DOC prompt, the current directory on drive A is set to \ WS \ DOC \ and the files in that directory are displayed.

FORMAT SPECIFICATION (PC FILE)

Once you have entered the file name, the file format is requested. ASTFT11 supports file formats used by most applications as well as those for BASIC programs. In some cases, no entry is required for this field. (See Section 4 for an explanation of file formats.)

The following prompt is displayed so that you can enter the format of the file specified:

Format:

After the file name and format entries are entered, a slight pause occurs while the existence of the specified file is checked by the software.

Although the format field allows for 12 characters, you will most likely use only a number to specify which predefined format you want. Optional format parameters may be included in the format specification. (See Section 4 for explanation of the file formats supported by ASTFT11.)

If a File Put function(F2) is selected and the file named is not found the following message is displayed on the bottom of the screen:

File Not Found

In this case, press any key to re-enter the file specifications. If the file is found, operation begins immediately.

If a File Get function (F1) is selected and the file named is not found, the following question is displayed on the bottom of the screen:

New File? (Y,N):

Enter a **Y** if the file is to be created or **N** (or other character) to respecify the drive and file name.

NOTE

If a new diskette file is created to receive data from the System/3X and the operation is aborted before any data are stored in that file, the file is automatically erased.

If a File Get function (F1) is selected and the file named is found, the following question is displayed on the bottom of the screen:

File Exists — Y = Overwrite, A = Append, N = Abort

Enter a **Y** to use and overwrite the existing file.

NOTE

If you choose to overwrite an existing file, consider whether or not that file should first be saved under another name in case the operation aborts and the file contents become unusable.

Enter an **A** to use and append data to the existing file.

Enter a **N** (or other character) to respecify the drive and file name.

2.2.2 File Transfer Tutorial Session

This subsection describes a predefined tutorial session that you may complete to learn file transfer. Be sure to read this entire manual before attempting this tutorial session. This session is based on the following assumptions:

- The file transfer software is installed on the System/3X and the Control file needed for the file transfer applications is created.
- The views to be used are created by the System/3X personnel. (Before you go through the sample session, check with the operations staff to be sure that all the System/3X files are in place.)
- The PC file transfer software is ready to use on your PC.
- The User's Manual has been read and is available during the session. (Also, the operations staff has read the Operator's Manual and is willing to work with you through a session.)

This session is to be one in which you create and add to a list of data and then access the data from the PC.

Each record is assumed to have the following format:

Field 1: Alphanumeric data (30 characters).
Field 2: Alphanumeric data (5 characters).
Field 3: Numeric data (nnnnnn.nn format, 8 digits).

The System/3X record length is thus 43 characters (bytes).

Your user ID is FRAN and your password is AAAA for sign-on to the AST-5250FT/11-A system. Use your appropriate user ID and password for sign-on to the System/3X.

The AST/5251-11 software is assumed to be running and the PC DOS session active. With these conditions all met, the following steps lead you through a session.

STEP ONE
Create test data to put to a view named PCPUT.

To do so, type the following immediately after the DOS prompt:

A>**COPY CON: DATA**<**Enter**>

This command causes any entry on the keyboard to be copied to a file named DATA on the default drive.

Type the following three data records:

AAAAAAAAAAAAAAAA,12345,100.55<**Enter**>
BBBBBBBBBBBBBBB,67890,200.99<**Enter**>
CCCCCCCCCCCCCCC,99999,999.99<**Enter**>

Press <**F6**> <**Enter**> to signal the end-of-file and to return to the DOS prompt.

The data you entered is now stored on the diskette in drive A in format type 0 (variable-length fields of ASCII characters separated by commas and ending with a Return code).

If any alphanumeric field (field 1 or 2) contained a comma, that field should be enclosed with double quote (“”) marks.

STEP TWO
Enter the following after the DOS prompt:

A>**ASTFT11**<**Enter**>

Once the main menu is displayed (see Figure 2-2), enter the user ID — **FRAN** — and the password — **AAAA**.

STEP THREE
In response to the function selection message, press <**F2**> to select the File Put function.

When the file specification prompt is displayed, enter **DATA** for the PC file. When the format prompt is displayed, enter **0**. (The format type specified must always match the format of the data on the diskette when performing a File Put function.)

When the view name prompt is displayed, enter **PCPUT** and press <**Enter**> to start transferring data.

The status message will appear on the bottom of the screen as the transfer occurs.

STEP FOUR
Once the transfer is completed, press <**F1**> to select the File Get function.

When the file specification prompt is displayed, enter **DATA1** for the PC file. When the format prompt is displayed, enter **0**.

When the view name prompt is displayed, enter **PCGET** and press <**Enter**> to start transferring data.

The status message will appear on the bottom of the screen as the transfer occurs.

STEP FIVE
Once the transfer is completed, press <**Alt**>-<**F10**> to exit to DOS.

Once the DOS prompt is displayed, enter the following to display the data just received from the System/3X:

A>**TYPE DATA1** <**Enter**>

The data will be displayed on your screen as a result of the above command.

You may want to retrieve the data using other formats in order to view the different formats. Most of the formats do not display meaningful data in response to the DOS TYPE command; however, format type 2 (DIF) proves interesting when displayed by the TYPE command.

Also, you may try putting more data using the view PCPUT. If the format of the data to be put does not match the format type specified, a FORMAT ERROR message occurs.

For example, you may get data in format type 3 (into a file DATA2) and then putting it using format 0 or 1.

SECTION 3

AST-5250FT/11-A FUNCTIONS

The various file transfer functions available to you are described in this section. The functions are grouped in three categories as follows:

- Data Base functions

  F1 = File Get
  F2 = File Put
  F3 = View Directory

- Print function

  System/3X-to-PC Printing

- Exit functions

  F10 = Quit and Off S/3X
  Alt-F10 = Quit
  ESC = Abort

3.1 Data Base Functions

The three data base functions enable you to actually transfer data between the PC and the System/3X. The View Directory function lists the names of the views available to you. The File Get function allows you to bring data from the System/3X to your PC, and the File Put function allows you to send data from your PC to the System/3X.

You may only transfer information that is defined by a *view*. Your views are defined with specific access privileges — read-only, enter-only, or library reference. All views that you access on the System/3X are read-only or library. When you send data to the System/3X, it is added to the System/3X file if the view is defined as an enter-only access.

3.1.1 File Get Function (F1)

The File Get function (F1 key) allows you to read the logical System/3X view (data file) named and place it in a selected diskette file for local PC processing.

If the view chosen is a library, you select the specific member from that library to retrieve and write to diskette file.

When you press <**F1**> from the menu shown in Figure 2-2, the parameter fields required for that function are displayed on the bottom portion of the screen one after another as shown in Figure 3-1. (The numbers enclosed in parentheses refer to notes after the figure.)

```
---------- [  F1—Get S/3x File  ] ----------

PC File: (1)                              Format: (2)

View Name: (3)        Member: (4)         Type(S,P): (5)
```

Figure 3-1. File Get Function Prompts.

NOTES TO FIGURE 3-1

(1) PC File — This field requires you to enter the name of the PC diskette file into which the data are to be written. You may enter the entire path name, if you are using a system with hard disk storage.

The default or current disk drive specification (for example, A:) is automatically displayed with the prompt. If you want to select a different drive, you must change the default drive to the correct letter. Then enter the correct file name (including path name if required) immediately after the colon of the drive specification.

When the file name prompt is displayed, an additional prompt tells you that the DOS directory for the drive shown will be displayed if you press <**Enter**>. If you need to view the DOS directory for a different volume, change the drive specification before you press <**Enter**>.

(2) Format

This field allows you to select the file format in which you want the data written to the PC file.

When this prompt is displayed, the valid formats are listed on the bottom portion of the screen so that you may choose the correct number for the format you wish.

This field requires that a number be entered that corresponds to one of the predefined formats — 0 = variable-length fields; 1 = fixed-length fields; 2 = DIF (Data Interchange Format); 3 = WKS or WRK; 4 = System/3X print files; 5 = unconverted (direct binary image), and 6 = ASCII fixed Length fields.

The default format is 0 (variable-length fields).

Optional format parameters may also be entered along with the format number in the format field. (See Section 4 for more explanation of file formats.)

(3) View Name — This field names the view that you want to access on the System/3X. (You can use the View Directory function (F3 key) to see a list of the view names available to you.)

If the view name that you enter selects a library, the fields shown by notes (4) and (5) are displayed.

If you specify a data view or use format 4 to specify a System/3X print file, those fields are not displayed.

(4) Member — This field is displayed whenever the view named is a System/3X library. The name of the System/3X member to be read and transferred is entered into this field.

(5) Type(S,P) — This field requests the type: *For the System/34 and System/36* enter the type of the library member; S = Source and P = Procedure.

System/38 users enter the source member format type; **S** = System Source (12-byte sequence/date prefix to data removed on download) or **P** = Program Source (entire record download).

If the File Get function (F1) is selected and the file named is not found, the following question is displayed on the bottom of the screen:

File Does Not Exist. Create? (Yes,No):

Enter a **Y** if the file is to be created or an **N** for respecified drive and file name.

If a new diskette file is created to receive data from the System/3X and the operation is aborted before any data are stored in that file, the file is automatically erased.

If the File Get function (F1) is selected and the file name is found, the following question is displayed on the bottom of the screen:

File Exists. Overwrite? (Yes,No,Append):

If you enter a **Y** in response, the old file is overwritten with the data transferred from the System/3X. If you enter an **A** in response, the transferred data are appended to the existing file. The Append option is only supported by Format 0 (Variable-Length Fields) and will not appear when other formats are used. If you enter an **N** (or other character), the file name prompt will again be highlighted so that you can enter a new drive and file name.

NOTE

If you choose to overwrite an existing file, consider whether or not that file should first be saved under another name in case the operation aborts and the file contents become unusable.

3.1.2 File Put Function (F2)

The File Put function (F2 key) allows you to send data to the specified view on the System/3X. Data sent from the PC to the System/3X can only be transferred to a view (logical file) defined as an "enter-only" access type. All data sent from the PC to the System/3X is added at (appended to) the end of the System/3X file.

The view named may be a library.

When you press <**F2**> from the menu shown in Figure 2-2, the parameter fields required for that function are displayed on the bottom portion of the screen one after another as shown in Figure 3-2. (The numbers enclosed in parentheses refer to the notes after the figure.)

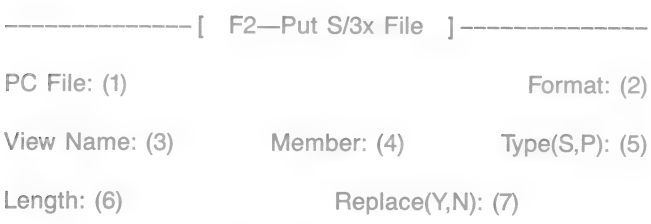


Figure 3-2. File Put Function Prompts.

NOTES TO FIGURE 3-2

(1) PC File — This field requires you to enter the name of the PC diskette file from which the data are to be taken. You may enter the entire path name, if you are using a system with hard disk storage.

The default disk drive specification (for example, A:) is automatically displayed with the prompt. If you want to select a different drive, you must change the drive shown to the correct drive letter. Then enter the correct file name (including path name, if required) immediately after the colon of the drive specification.

When the file name prompt is displayed, an additional prompt tells you that the DOS directory for the drive shown will be displayed if you press <**Enter**>.

If you need to view the DOS directory for a different volume, change the drive specification before you press <**Enter**>.

If the file named is not found, the following message is displayed on the bottom of the screen:

File Not Found

In this case, you must press any key to release the message and then re-enter the diskette file specifications.

(2) Format

This field allows you to select the file format in which you want the data when it is transferred to the System/3X.

When this prompt is displayed, the valid formats are listed on the bottom portion of the screen so that you may choose the correct number for the format you wish.

This field requires that a number be entered that corresponds to one of the predefined formats — 0 = variable-length fields; 1 = fixed-length fields; 2 = DIF (Data Interchange Format); 3 = WKS or WRK; 4 = System/3X print files; 5 = unconverted (direct binary image), and 6 = ASCII fixed length fields.

The default format is 0 (variable-length fields).

Optional format parameters may also be entered along with the format number in the format field. (See Section 4 for more explanation of file formats.)

(3) View Name

This field names the view that you want to access on the System/3X.

When the function selection message is displayed on the menu, you can press <**F3**> (View Directory function) to see a list of view names available to you.

That is, you can use the F3 key before you select a File Get or File Put function or if you press <**Esc**> to return to the function selection portion of the menu.

This name is the "entry-only" access view to which you want to transfer information.

If the view name that you enter selects a library, the fields shown by notes (4), (5), (6), and (7) are displayed.

If you specify a data view, those fields are not displayed.

(4) Member

This field is displayed whenever the view named is a System/3X library. The name of the System/3X member that is to be written to is entered in this field.

(5) Type(S,P) This field requests the type.

For System/34 and System/36 users: enter the member type; S = Source and P = Procedure. *For System/38 users:* enter **S** for a system maintained source member (a 12- byte sequence/date prefix will be added to each record) or **P** for a program maintained member (data uploaded as is).

(6) Length This field requires a numeric entry; the number specifies the length of the records in the specific member that is to be sent to the System/3X library.

For System/34/36 the default is 96 for type S and 120 for type P (values 4 to 120 are valid).

For System/38 the default is 92 for type S or 0 for type P.

If you press <**Enter**> key without making an entry, the default value is used and displayed on the screen.

NOTE

Check with your System/3X person regarding the record lengths that you should use for this function.

(7) Replace (Y,N)

This field asks if the existing library member should be replaced. If the library member already exists on the System/3X, a "Y" in this field causes that member to be replaced by the member being sent to the System/3X.

If the member being transferred to the System/3X is new and does not already exist on the System/3X, an "N" should be entered in this field.

This prompt is a check to ensure than an existing file is not overwritten in error.

If a "Y" is entered and the software does not find a file corresponding to the view named, a library error message is displayed, and you press any key to continue. Then the program redisplays the View Name field to allow you to enter a valid name.

If a "N" is entered but a file with that name is found, a library error message is displayed, and you press any key to continue. Then the program redisplays the View Name field to allow you to respecify the name and then continue with the specifications.

3.1.3 View Directory Function (F3)

The View Directory function (F3) displays the names and access types of all System/3X views available to you. When you press <**F3**> from the menu shown in Figure 2-2, a new screen is displayed that is formatted into eight columns of 16 entries per column (when the screen is full).

A sample view directory is shown in Figure 3-3.

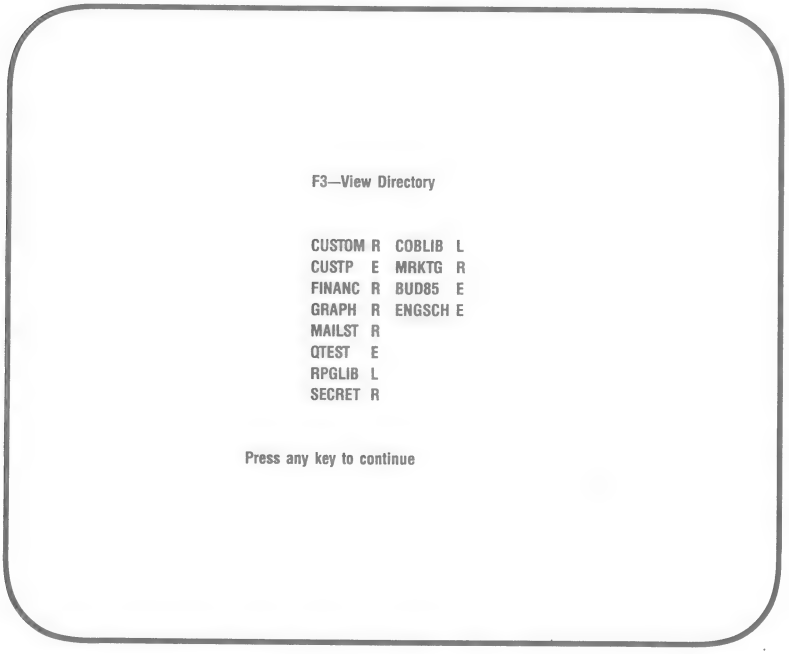


Figure 3-3. Sample View Directory.

All of the views available to you are listed on this screen. After each view name, a code denotes the view access type: R = read only; E = entry-only; and L = library reference.

The message at the bottom of the screen requests you to press any key when you finish viewing the screen. This action causes the original master screen to be redisplayed.

3.2 Print Function

You may transfer information from a System/3X print spool file to your PC so that you can print it on the local printer attached to your PC or use it as input to word processing programs that accept ASCII input.

This function is not listed on the menu because you are actually "Getting" data from the System/3X; thus, you use the File Get function (F1).

In order to bring the data from the System/3X to the PC for printing, the systems person must (1) extract the data from a System/3X print spool file and (2) define a view that contains the print data file. Once those tasks are completed, you access that view by name using the F1 (File Get function) key and using format type 4 (System/3X print files).

After the data is received at the PC and written to a diskette file, you can use the DOS COPY LPT1: or PRINT commands to print the file. Also, print files brought to the PC using format type 4 can be used as input to word processing programs.

If you want to use the print data file as input for a custom program, you may also access the view by name (F1) and use a format type 0 (variable length fields). In this case, each PC diskette record consists of four fields: page number, line number, record number, and print line.

3.3 Exit Functions

Two exit functions are available to you:

F10 = Quit & Off S/3X
Alt-F10 = Quit

These two functions are support functions for the actual file transfer process. Also, the <**Esc**> key can be used to abort a particular function/operation while using the menu.

3.3.1 Quit & Off/S3X (F10)

The Quit & Off S/3X function (F10) allows you to sign off of the System/3X at the end of a file transfer session.

If you press <**F10**> the file transfer session with the System/3X is terminated, and the DOS prompt will be displayed so that you can execute a program or re-execute the emulation.

3.3.2 Quit (Alt-F10)

The Quit function (Alt-F10) allows you to terminate the file transfer session but does not sign you off of the System/3X.

If you have completed all file transfer operations and want to return to a previous emulation session, press the <Alt>-<F10> key sequence.

When the DOS prompt is displayed on the screen, you can use the hot-key (<Alt>-<Esc>) sequence or press both shift keys simultaneously to return to emulation.

Using the <Alt>-<F10> key sequence is the normal method of ending a file transfer session and returning to emulation.

3.3.3 ABORT (Esc Key)

Anytime during the file transfer process, you may press <**Esc**> to abort the current action.

Once you are logged on to the System/3X and ASTFT11 is active, pressing <**Esc**> stops any current function selection and returns you to the function select menu.

If you abort (stop) an operation after the transfer or receive is in progress, the file receiving any information will: (1) be lost if it is a new file; or (2) contain unusable data if it is an "old" (existing) file.

If you press <**Esc**> during the "field entry" phase of an operation, that particular field entry is aborted and the menu is redisplayed for selection of a function.

SECTION 4

APPLICATIONS FILE FORMATS

One of the most important features of AST-5250FT/11-A is the automatic conversion of information into a selected file format. That is, an applications program builds and uses files of a particular format. Different applications programs use different formats.

In order for information sent between the System/3X and the PC to be used by an applications program on the PC, that data must be in the file format that the program can use. With other file transfer programs, the user must convert or translate the transferred data into the correct format before it can be used by the applications program. With AST-5250FT/11-A, however, the conversion is completed automatically as part of the file transfer operation.

AST-5250FT/11-A supports formats for most popular PC applications programs, and new formats will be added as increasingly popular applications become dominant in the industry.

Whenever you perform a File Put or File Get function, you may specify a file format. A specific format selection causes the data retrieved from the System/3X to be written into the PC diskette files in the format directly usable by the PC applications program.

In most cases, you only need to know the format number that corresponds to the application that you are using. The formats currently defined for use by AST-5250FT/11-A are as listed in Table 4-1.

Table 4-1. File Formats Supported.

Format #	Type	Comments
0	Variable-Length Fields	Used by WordStar & WordStar family (SpellStar, MailMerge, and so forth; dBase II & III™ and BASIC sequential).
1	Fixed-Length Fields	Used by IBM BASIC (random).
2	DIF (Data Interchange Format)	Used by VisiCalc™.
3	WKS or WRK	Used by Lotus 1-2-3 (WKS) and Symphony™ (WRK).
4	System/3X Print Files	Used to bring spool file data to the PC.
5	Unconverted	Used to transfer the direct binary image of a file. (BABY 34/36)
6	ASCII Fixed-Length Fields	Cobol line sequential files — dBase II & III "SDF" format.

Format numbers 0 through 9 are predefined formats; however, only seven are currently assigned. The remaining three predefined formats will be assigned as new applications warrant their inclusion.

This section describes each format and its optional format parameters. Most likely, you will *ONLY* need this reference information if you are writing your own PC application or if you are using an unusual applications package.

The subsections explain the format and optional parameters; also, applications notes are provided, if applicable. Two additional subsections are included that discuss: (1) the usage of the "/X" option with the File Put function and (2) data conversion.

Table 4-2 lists the applications supported and the correct format number to use for that particular program. The table is not all inclusive; it only represents the applications that have been thoroughly tested using AST-5250FT/11-A.

Table 4-2. Applications and Formats.

Program	Format #
BABY 34/36	5
BASIC (sequential files)	0
BASIC (random files)1	
COBOL	6
DataStar	0
dBase II and dBase III	0 or 6
Lotus 1-2-3	3
Symphony	3
VisiCalc	2
WordStar (SpellStar, MailMerge, and other family members)	0

If your applications program is not included in Table 4-2 and you have tried to determine the correct format based on this section but cannot do so, contact your AST dealer or AST Customer Support for help in using the file format capability.

4.1 Format 0 — Variable-Length Fields

Format 0 (variable-length fields) is used for BASIC/C-BASIC sequential files and C-BASIC random files. It is also used for programs such as DataStar, MailMerge, InfoStar, and so forth. If you want to bring information to the PC from the System/3X to be added to a data base managed by either dBase II or III, format 0 allows you to add the information to those files.

This format is the *default* format used for both the File Get and File Put functions.

This format is valuable for examining data visually on the screen or using a text editor.

A file with a variable-length field format (format 0) contains records in which the Carriage Return (CR) and Line-Feed (LF) characters (hexadecimal 0D and 0A, respectively) are used to terminate each record. That is, these two characters designate End-of-Record (EOR).

Fields within the record are variable-length strings of ASCII characters which are separated (delimited) from each other by a comma.

If a comma is used normally within the field and is not to delimit the field, the field is enclosed in quote characters.

If a quote character is used normally within the field and not to specify a field containing a comma, the quote characters are doubled.

For files of variable-length fields, the <Ctrl>-Z character (hexadecimal 1A) is normally used as an End-of-File (EOF) mark.

4.1.1 Optional Format Parameters

Several optional parameters may be used with format 0 in order to change the format conventions. For example, although records in this format are generally of a variable length, a fixed length may be specified by using the "/n" parameter which causes blank characters to be inserted in the record to fill it out to the length specified.

The following paragraphs describe the various optional parameters that may be specified in the format field to modify the variable-length fields format.

/n This parameter modifies the variable-length aspect so that the record is of a fixed length of "n", where $0 < n < 1025$.

The length specified includes the two characters (CR and LF) used to mark the EOR.

When this option is used with the format number, spaces (blank characters) are inserted in the record to pad it before the terminating CR and LF characters occur. Thus, the fixed-length specification is achieved.

If the actual length of the record is greater than n, an error — 39 RECORD LENGTH ERROR — is posted. (See Appendix A for an explanation of errors.)

/Dp,v This parameter may be used to specify a deleted record. (File Put function only.)

A diskette record is assumed to be deleted if the character at the position "p" (which is a number 1 through n) has the ASCII code decimal value of the character (a three-digit number). See Appendix B for a list of the ASCII code values.

/Ep,v This parameter may be used to signify the end-of-file (EOF).

A data record read from the diskette is assumed to be the end of the file if the character in the position "p" (which is a number 1 through n) has the ASCII decimal code value of the character (a three-digit number). See Appendix B for a list of the ASCII code values.

When a File Put operation is selected, the EOF record is written to the diskette when the file transfer is complete.

/Qn This parameter may be used to change the standard quote representation convention.

The default condition is Q0 where all alphanumeric fields that contain commas not used as delimiters are surrounded by quote characters and where all quote characters within the alphanumeric fields are doubled. Fields that do not contain commas are not surrounded by quote characters.

However, using this optional parameter, other quote conventions may be specified. This form — /Qn — is used where the "n" following the "/Q" denotes the desired option.

The values shown in the following paragraphs which are associated with the quote convention options can be added together to produce a combined result such as /Q3, the optional parameter which offers the features of both /Q1 and /Q2.

/Q1 — This parameter is the same as the default except that all quote characters contained within an alphanumeric field (which is surrounded by quote characters) are changed to the ASCII character "^" (hexadecimal 5E).

/Q2 — This parameter specifies that all alphanumeric fields are surrounded by quote characters regardless of whether or not commas are contained within the field.

All quote characters contained within the alphanumeric fields are doubled.

/Q4 — This parameter modifies the convention that the occurrence of a quote character followed by a comma character within an alphanumeric field denotes the immediate end of the field.

This parameter modifies that convention such that if alphanumeric fields are known to contain such character combinations within them, the combination can occur without signaling the end of the field as long as all quote characters within the field have been doubled.

/X This parameter is used to specify that bad records should be ignored.

Normally, if a bad record is detected in the data file on a File Put operation, the operation is aborted. An error message — 24 BAD RECORD FORMAT — is posted. (See Appendix A for an explanation of errors.)

If the data file is known to contain bad records (for example, bad field values or too many fields), the /X parameter can be used to cause such records to be skipped.

An example of a bad field is an alphanumeric field that occupies the position of a numeric field or a numeric field that is over the allowable size for the System/3X field.

An example of using the optional parameters for format 0 is as follows:

0/096/Q1

where the first 0 specifies the format type; the 096 ("n") causes records to be filled with blanks to a length of 96 characters; and Q1 causes all quote characters within an alphanumeric field to be changed to the ASCII character "^".

4.1.2 Applications Notes

This information gives applications notes regarding transferring data from the System/3X to the PC and adding it to a dBase file.

Format 0 separates all fields with commas and surrounds any field containing a comma with quote characters. If a field contains quote characters, you should use the format 0 with the /Q1 parameter (0/Q1). This format specification will change the embedded quote characters to the ASCII "^" character.

Also, you should give the downloaded file an extension of ".TXT" because it simplifies future manipulation of the file.

Once the file is transferred onto a DOS-compatible diskette, use the APPEND command with its DELIMITED option to add the new file to the existing dBase file. For example, to add a file <filename> to a dBASE structure, use the following command:

APPEND FROM filename DELIMITED<Enter>

where *filename* is the new file to be appended to the existing dBASE file.

This example assumes that the dBASE file was created with the same structure as the data downloaded from the System/3X and that the file is in use. Because the PC DOS file was given the ".TXT" extension, you do not need to enter the extension when appending the information.

This command adds the downloaded data to the file currently in use, if the file structures are compatible.

If you want to "upload" or transfer data to the System/3X, a correctly structured view must be defined on the System/3X. In that case, use the COPY command to create a DOS file that can be transferred. The exact command would be:

COPY TO filename DELIMITED WITH <Enter>

where *filename* is the DOS file to be transferred.

4.2 Format 1 — Fixed-Length Fields

Format 1 (fixed-length fields or fixed-length records) is used for PC and M-BASIC random files and for any applications programs that use these file types.

Not commonly encountered in commercially available programs, this particular format provides increased speed in some situations and can be beneficial for users who are writing their own BASIC programs.

A file with a fixed-length field format (format 1) contains records in which each field is a fixed length — thus, the record length is also fixed.

No special characters are used to separate either fields or records. Numeric fields are stored in internal machine format, and alphanumeric fields are strings of ASCII characters with blank fill (blanks/spaces are added to fill out the required length of the field).

4.2.1 Optional Format Parameters

Several optional parameters may be used with format 1 in order to change the format conventions. For example, although records in this format are of a fixed length, the specified length may be modified by using the "/n" parameter.

The following paragraphs describe the various optional parameters that may be specified in the format field to modify the fixed-length fields format.

/n This parameter modifies the fixed-length aspect so that the record length is fixed as "n", where $0 < n < 1025$.

It is not necessary for the user to specify a record length. It is calculated from the view on the System/3X. However, if a length is specified on a GET the same length must be specified on the corresponding PUT.

On a GET if the data length calculated from the view is less than "n", the PC record is filled with binary zeros. If the view data length is greater than "n", an error — 39 RECORD LENGTH ERROR — is posted. (See Appendix A for an explanation of errors.)

On a PUT if the data length calculated from the view is less than "n", then the length of the PC record read is n and all data over the view data length is truncated. If the view data length is greater than "n", an error — 39 RECORD LENGTH ERROR — is posted. (See Appendix A for an explanation of errors.)

/Dp,v This parameter may be used to specify a deleted record. (File Put function only.)

A diskette record is assumed to be deleted if the character at the position "p" (which is a number 1 through n) has the ASCII code decimal value of the character (a three-digit number). See Appendix B for a list of the ASCII code values.

/Ep,v This parameter may be used to signify the EOF.

A data record read from the diskette is to be the end of the file if the character in the position "p" (which is a number 1 through n) has the ASCII code value of the character (a three-digit number). See Appendix B for a list of the ASCII code values.

When a File Get operation is selected, the EOF record is written to the diskette when the file transfer is complete.

/I Integer Precision
and
/S Single Precision

These two parameters modify the data conversion of numeric fields obtained from the System/3X.

Normally, all numeric fields obtained from the System/3X (using the File Get function) are converted to double precision. Using the /I or /S parameter changes this conversion for all numeric fields that fit within the space; all numbers that do not fit are converted to double precision.

Using the /I parameter converts all System/3X integer number fields that will fit into interger format, as follows:

Zoned decimal fields with a length of 4 bytes or less.

Packed decimal fields with a length of 1 or 2 bytes.

Binary fields with a length of 2 bytes or less.

Using the /S parameter converts all System/3X numeric values that will fit into single precision, as follows:

Zoned decimal fields with a length of 7 bytes or less.

Packed decimal fields of 4 bytes or less.

Binary fields of 3 bytes or less.

/X This parameter is used to specify that bad records should be ignored.

Normally, if a bad record is detected in the data file on a File Put operation, the operation is aborted. An error message — 24 BAD RECORD FORMAT — is posted. (See Appendix A for an explanation of errors.)

If the data file is known to contain bad records (for example, bad field values or too many fields), the /X parameter can be used to cause such records to be skipped.

An example of a bad field is an alphanumeric field that occupies the position of a numeric field or a numeric field that is over the allowable size for the System/3X field.

4.3 Format 2 — DIF (Data Interchange Format)

Format 2 (DIF or Data Interchange Format) is used by many applications programs to interchange data with other programs. For example, the VisiCalc™ spreadsheet program uses the DIF file format.

Files created in this format should be given an extension of .DIF in order to be recognized as DIF files by the applications programs.

If the data in this format is created by a spreadsheet program, you should be careful to avoid any null row or column positions because these usually default to alphanumeric fields regardless of the balance of the spreadsheet.

Such null fields may end up in a position normally occupied by numeric data and, thus, cause a problem with the field format.

4.3.1 Optional Format Parameters

Only one optional parameter may be used with Format 2 — the /X option.

The following paragraphs describe this optional parameter.

/X This parameter is used to specify that bad records should be ignored.

Normally, if a bad record is detected in the data file on a File Put operation, the operation is aborted. An error message — 24 BAD RECORD FORMAT — is posted. (See Appendix A for an explanation of errors.)

If the data file is known to contain bad records (for example, bad field values or too many fields), the /X parameter can be used to cause such records to be skipped.

An example of a bad field is an alphanumeric field that occupies the position of a numeric field or a numeric field that is over the allowable size for the System/3X field.

4.4 Format 3 — WKS or WRK

Format 3 (WKS or WRK) is used for Lotus 1-2-3 (WKS) or Symphony (WRK) files. Lotus 1-2-3 will also accept data that is specified with Format 2; however, that process requires an additional step.

Files created in this format should be given an extension of .WKS or .WRK in order to be recognized as Lotus 1-2-3 or Symphony files, respectively.

4.4.1 Optional Format Parameters

The following paragraphs describe the optional parameters that may be used to modify the standard format conventions for this format type.

/X This parameter is used to specify that bad records should be ignored.

Normally, if a bad record is detected in the data file on a File Put operation, the operation is aborted. An error message — 24 BAD RECORD FORMAT — is posted. (See Appendix A for an explanation of errors.)

If the data file is known to contain bad records (for example, bad field values or too many fields), the /X parameter can be used to cause such records to be skipped.

An example of a bad field is an alphanumeric field that occupies the position of a numeric field or a numeric field that is over the allowable size for the System/3X field.

Because spreadsheet data often contains column or row labels that are not part of the actual data, this parameter can be very useful.

/C This parameter allows the data to be saved by column.

Normally, data saved in Format 3 are created so that the data can be loaded onto the spreadsheet by rows. Thus, each record of data occupies a separate row on the spreadsheet.

If you want to save the data so that a record represents each column, use the /C option.

4.4.2 Applications Notes

This information provides applications notes regarding transferring data from the System/3X directly to a Lotus 1-2-3 file.

Data from DecisionLink can be directly downloaded to LOTUS using DecisionLink Format 3 (WKS). If a view is created on the mainframe, that is an exact copy of the data structure that is needed in the spreadsheet, the file can be loaded directly into Lotus 1-2-3 using the following command sequence:

/FILE RETRIEVE filename <Enter>

where *filename* is the System/3x file to be loaded into Lotus 1-2-3.

Generally, a data file cannot be created that can be mapped into the spreadsheet row-for-row or column-for-column. That is, because the spreadsheet uses some columns and rows for formulas and for formatting, the data cannot be easily mapped.

A simple solution to this restriction is to append the downloaded data to an unused portion of the spreadsheet. Once the data is loaded in the spreadsheet, formulas can be used to distribute the data to the correct cells. Of course, the spreadsheet must have a free area in which to receive the data.

Once the data has been transferred from the System/3X and you wish to insert the file in the Lotus spreadsheet file, position the cursor at the address of the range to which the data is to be inserted and enter the following command sequence:

/FILE COMBINE COPY ENTIRE FILE filename <Enter>

where *filename* is the System/3X file to be inserted in the Lotus spreadsheet file.

The following example illustrates this simple means of moving the data into the appropriate cells. Assume the spreadsheet contains a simple income statement with the rows and columns defined as follows:

ROW A:	Titles	ROW H:	Titles
ROW B:	———	ROW I:	Product Expenses
ROW C:	Product Revenues	ROW J:	Sales Expenses
ROW D:	Service Revenues	ROW K:	G&A Expenses
ROW E:	———	ROW L:	———
ROW F:	+C+D (Total Revs.)	ROW M:	+I+K+L (Total Expenses)
ROW G:	(blank)	ROW N:	(blank)
		ROW O:	+F-N (Profit)

COL 1:	Titles	COL 3:	Year 2
COL 2:	Year 1 COL 4:	Year 3	

Assume that the data for Year 1 are to be transferred from the System/3X. This data must be inserted into COL 2, ROWS C, D, I, J, and K.

However, these rows do not follow one another continuously; it is not neccessary to place data in ROWS A, B, E, F, G, H, L, M, N, and O. To place the appropriate data in the appropriate cells, the downloaded data is added to the spreadsheet file in COL 5, ROWS A through E.

Then the following formulas are added to the spreadsheet:

At cell C2	+A5
At cell D2	+B5
At cell I2	+C5
At cell J2	+D5
At cell K2	+E5

Thus, the data are correctly distributed into the spreadsheet. A similar exercise can easily transfer data to any position in the spreadsheet.

If you need to upload (transfer) the data to the System/3X after it is operated on by Lotus, you must copy the data to a cell range where the rows follow each other continuously (contiguous range) and then save the range using the Lotus command sequence shown below:

/FILE XTRACT VALUES filename range <Enter>

where:

filename is the Lotus file to be transfered to the System/3X.

range is the rows which follow each other continuously.

Inserting formulas in the spreadsheet allows you to create the contiguous range of data that is required for the transfer operation. Also, a valid view must be defined on the System/3X to receive the transferred data. Use format 3 for making this transfer to the System/3X.

4.5 Format 4 — System/3X Print Files

Format 4 (System/3X Print Files) is used to convert the System/3X data files that are extracted from a System/3X print spool file to a format that allows the data to be printed at the PC.

This format may only be used with a File Get function. If format 4 is specified for a view that is not designated as an extracted spool file entry, an error message occurs.

Files created in this format contain Formfeed (FF) characters that use a combination of CR and LF charcters to denote a new line.

Double striking is supported with this format.

4.5.1 Optional Format Parameters

The following paragraphs describe the only optional parameter allowed with Format 4.

/n This parameter modifies the default line length to "n", where $0 < n < 1025$.

When this option is used with the format number, the length is the actual length of the line.

If no line length is specified, the line width defaults to that specified by the System/3X print file.

4.6. Format 5 — Unconverted

Format 5 (unconverted) together with a special view format, make it possible for images of PC diskette/disk files to be stored on and retrieved from the System/3X.

A common program, spreadsheet file, or word processing document can be stored in a System/3X data file and retrieved for use at the same or another PC. In this manner, such items can be shared by or distributed to many PC users. For instance, the current version of a program could be kept on the System/3X and each PC user of this program could always retrieve the latest copy for execution.

For this purpose, two special views are needed for each unique PC file, one for PUT (store file) and one for GET (retrieve file). Both views should specify a record length of 128, 256, or 512 and should contain one binary or packed field. It is recommended that the view specify one binary field of length 1 and one or more alpha fields equaling 127, 255, or 511 in length.

The name of the file used to hold the binary image is arbitrary, but must be the same for both views. Data PUT to the System/3X using Format 5 will be padded, if necessary, with binary zeroes to form an integral number of records of the length specified. On a subsequent GET, the file size will be a multiple of the record length.

An example of the special views needed for this process follows. The PUT view is named BPUT and the GET view is named BGET. Both views reference a data file named BFILE which is defined as a sequential file with a record length of 256 and arbitrary size of 400 records (room for approximately a 100-kilobyte (KB) file).

NOTE

In the views that follow, Record Type — 1 View Header contains abbreviations as follows:

Access
- R = Read Only
- E = Enter Only
- L = Library Reference

Record Type — 3 Field Definition contains abbreviations as follows:

Field Type
- K = Key Field
- D = Deleted Record Specification

Data Format
- A = Alphanumeric
- N = Numeric
- P = Packed Numeric
- B = Binary

PUT VIEW (BPUT) SPECIFICATION

Create/Edit View

View Name .....BPUT
View Library .....DLINK
Compile View(Y/N) .....Y

Record Type — 1 View Header

View Title .....PUT BINARY FILE
Access (R,E,L) .....E
Security Access (00-16) 00
Group Access .....

Record Type — 2 Record Definition Header

Record Definition 01
File Name .....BFILE
Access (I = Indexed,
R = Relative Record) .....R

Record Type — 3 Field Definitions

Field Name .....KEY
Field Type (K,C,T,D) .....K
Starting Position 0001
Ending Position 0001
Data Format (A,N,P,B) .....B
Decimal Positions 0
Security Level (0-9) 0
Logical Field Number 001
Field Notes/Codes .....BINARY FLG

Record Type — 3 Field Definitions

Field Name .....SECTOR
Field Type (K,C,T,D) .....
Starting Position 0002
Ending Position 0256
Data Format (A,N,P,B) .....A
Decimal Positions .....
Security Level (0-9) 0
Logical Field Number 002
Field Notes/Codes .....

GET VIEW (BGET) SPECIFICATION

To create BGET, copy view BPUT and rename it to BGET. Edit the View Header record to change the title to GET BINARY FILE and the Access from E (Enter Only) to R (Read Only).

Create/Edit View

View Name .....BGET
View Library .....DLINK
Compile View (Y/N) .....Y

Record Type — 1 View Header

View Title .....GET BINARY FILE
Acess (R,E,L) .....R
Security Access (00-16) 00
Group Access .....

Record Type — 2 Record Definition Header

Record Definition 01
File Name .....BFILE
Access (I = Indexed,
R = Relative Record) .....R

Record Type — 3 Field Definitions

Field Name .....KEY
Field Type (K,C,T,D) .....K
Starting Position 0001
Ending Position 0001
Data Format (A,N,P,B) .....B
Decimal Positions 0
Security Level (0-9) 0
Logical Field Number 001
Field Notes/Codes .....BINARY FLG

Record Type — 3 Field Definitions

Field Name .....SECTOR
Field Type (K,C,T,D) .....
Starting Position 0002
Ending Position 0256
Data Format (A,N,P,B) .....A
Decimal Positions .....
Security Level (0-9) 0
Logical Field Number 002
Field Notes/Codes .....

4.7 Format 6 — ASCII Fixed-Length Fields

Format 6 is used for COBOL line sequential files, direct access files that do not require a file header, C direct access files, and with applications programs that use these file types. This format with parameters "/T/N4,0" defines the dBase "SDF" record format and can also be used to examine data visually on the screen or with a text editor.

Records of this file type are of fixed length and each field is of fixed length. No special characters are used to separate fields or records. Alphanumeric fields remain as they were on the System/3X (but are converted to ASCII). Numeric fields are converted to ASCII strings with the sign leading and separate, and no decimal point (default). The decimal point can optionally be declared explicit. The numeric field signs can be selected (see Section 4.7.1, /Nm,n) by the user to be separate or merged (also called combined or shared), leading or trailing. Numeric fields are stored right justified and filled with leading zeros.

4.7.1 Optional Format Parameters

The following paragraphs describe the optional parameters that may be used to modify the standard format conventions for this format type.

/n This parameter modifies the fixed-length aspect so that the record length is fixed as "n", where $0 < n < 1025$.

It is not necessary for the user to specify a record length, it is calculated from the view on the System/3X. However, if a length is specified on the corresponding GET the same length must be specified on the corresponding PUT.

On a GET if the data length calculated from the view is less than "n", the PC record is filled with spaces (blanks). If the view data length is greater than "n", an error — 39 RECORD LENGTH ERROR — is posted. (See Appendix A for an explanation of errors.)

On a PUT if the data length calculated from a view is less than "n", then the length of the PC record read is n and all data over the view data length is truncated. If the view data length is greater than "n", an error — 39 RECORD LENGTH ERROR — is posted. (See Appendix A for an explanation of errors.)

/Nm,n This parameter may be used to specify the way numeric fields are formatted with respect ot sign and decimal point.

The value "m" denotes whether the sign is a separate character or merged with one of the digits: 0 = sign is leading and separate (default), 1 = sign is leading and merged, 2 = sign is trailing and separate, 3 = sign is trailing and merged. Add 4 to "m" if the field has an explicit decimal point (for example, 4 = leading separate sign with explicit decimal point in field).

If the sign is merged with one of the digits, "n" specifies the way in which signs are coded. If the value of "n" is 16 then combined signs will be stored or read using the standard COBOL format. The values 0 through 15 specify the pattern of the high 4 bits that represent a negative number when using merged sign. For example, the Realia COBOL "n" = 2 (35 hex = 5,, 25 hex = -5). To make all numbers positive, use "n" = 3.

/T This parameter may be used to terminate records with a carriage return — line feed (hex 0D0A). The carriage return — line feed (CF/LF) is not included in the record length.

NOTE

When the "/T" option is used with a GET, records are read up to the CR/LF and filled or truncated to the System/3X record size.

/Dp,v This parameter may be used to specify a deleted record. (File Put function only.)

A diskette record is assumed to be deleted if the character at position "p" has a decimal value of "v". (See Appendix G of the *IBM-PC BASIC Manual* for character code values.)

/Ep,v This parameter may be used to signify the EOF.

A data record read from the diskette is to be the EOF if the character in position "p" has a decimal value "v". On a GET operation, an EOF record is written to diskette when the file transfer is complete.

/X This parameter is used to specify that bad records should be ignored.

Normally, if a pad record is detected in the data file on a File Put operation, the operation is aborted. An error message — 24 BAD RECORD FORMAT — is posted. (See Appendix A for an explanation of errors.)

If the data file is known to contain bad records (for example, bad field values or too many fields), the /X parameter can be used to cause such records to be skipped.

An example of a bad field is an alphanumeric field that occupies the position of a numeric field or a numeric field that is over the allowable size for the System/3X field.

The following examples illustrate field size for the System/3X and IBM-PC:

System/3X Data Type		PC Length
Alpha	=	same length
Zoned numeric	=	# of zoned bytes
Packed nummeric	=	# of packed bytes × 2—1
1 — 2 byte binary number	=	5 bytes
3 — 4 byte binary number	=	10 bytes
10 byte alpha	=	10 bytes ASCII alpha
6 byte zoned numeric	=	6 bytes ASCII number
3 byte packed numeric	=	5 bytes ASCII number
1 byte binary number	=	5 bytes ASCII number
4 byte binary number	=	10 bytes ASCII number

NOTE

For PC numeric fields, add 1 to length if sign is a separate character and add 1 if explicit sign is included.

4.7.2 Applications Notes

This information gives application notes regarding transferring data from the System/3X to the PC and adding it to the dBase "SDF" file.

The dBase "SDF" record format can be described using Format 6, specifically Format 6/T/N4,0. Format 6 specifies a fixed length field/record format with leading sign and explicit decimal point for numeric fields. Use the following dBase command to append data to a dBase file:

APPEND FROM filename SDF

where *filename* is the dBase file to be appended to.

The following command creates DOS file for upload:

COPY TO filename SDF

where *filename* is the DOS file to be uploaded.

Using Format 6 with parameters /T/N4,0 avoids the double quote problem that may occur with Format 0.

4.8 Usage Notes — /X Optional Parameter

This subsection contains several usage notes regarding the /X optional parameter used with the File Put function.

The /X optional parameter is an aid to transferring data that do not exactly conform to the format required by the System/3X. That is, this option allows data to be sent to the System/3X regardless of records within the data which are completely wrong ("garbage records") or which contain either extra or missing fields.

Normally, if a single record in the data does not exactly match the file specifications, the file transfer terminates. The /X option allows the transfer to continue by removing only the records that are detected as being in error.

The following points present several situations in which the /X option is useful.

- The data to be transferred to the System/3X are known to contain garbage records.

  The data could be corrected so that the records matched the required specifications. However, the effort required to do so is not warranted or else the job is done so infrequently that the effort is not justified.

- The data file on the PC contains more fields in the record than does the System/3X file. The fields of the two records are in the same logical sequence, but the PC file contains more fields than the System/3X file.

  Using the /X option with most format types removes the extra fields.

- The file on the PC has the same record format as that on the System/3X except that the alphanumeric fields on the PC file are of a longer length than those on the System/3X file.

  Using the /X option truncates the fields and allows them to be transferred to the System/3X.

  If the file contains numeric fields that are too long to fit the System/3X file, the records that contain the numeric fields will be removed and the remainder of the data will be transferred.

- A spreadsheet contains clean rows of data with a set number of fields that are exactly equal to either one record per row or an exact multiple of records. Also, a simple title and dashed separator line (or blank row) are inserted for readability.

Using the /X option strips out the title and separator line.

However, this optional paramenter should not be used to clean up a spreadsheet that contains a complete free record format. If that were to be the case, it is almost impossible to predict which data will be transferred and which data will be discarded.

Generally, you should take extra care in using the /X option with a spreadsheet data file.

In fact, you should not use the /X option on a repeated basis. Rather, if, for example, a particular applications program requires you to use the /X option each time new data are to be transferred, review the design of the program or the data specification given.

If, for example, you are using DataStar™ to generate the data, the specifications given to DataStar determine the format of the finished data.

The following points relate how to predict which data are to be removed.

- All fields encountered in sequence must comply with the definitions given at the System/3X.

  For example, if the first field is specified as an alphanumeric field, a numeric field would not be accepted.

  In Format 0 no method exists for distinguishing between a numeric field and an alphanumeric field consisting of numbers. If bad fields are discovered within a record, the record will be discarded.

- A PC record containing fewer fields than the System/3X record can be transferred successfully using format 0; however, that is not the case for formats 2 or 3.

  If not enough fields exist to meet the record specification at the System/3X for format 0, the remaining fields are padded with logical blanks. The other format types will discard the bad record.

- If records contain extra fields, using the /X option causes the records to remain if the format is 0 or 2. The extra fields are simply removed.

  A format 3 continues to build new records from any data that are encountered as extra. This situation can lead to unpredictable results.

- Any numeric values that are "over range" will be discarded as will the entire record. Using the /X parameter, any alphanumeric fields that are too long will be truncated and passed.

  Any numeric values (such as 1.0*10-36) that are "under range" will be set to 0 and passed.

- Format 3 (used for Lotus 1-2-3 files) is not checked for row and column positions. Thus, the user can put more than one record on each row.

  However, the result is that if a record contains fewer fields than are needed, the record wraps around to the next row to get the data.

  This situation may cause both records to be discarded if the /X option is specified. Or the first field from the next record (row) may be used in the previous record if everything else about the data are correct for the specification at the System/3X. If you experience this problem frequently, use format 2 (DIF) for the transfer because that format allows only one record per row. It does not allow wraparound.

4.9 Data Conversion

Several pieces of information may be useful to you regarding data conversion. The following points summarize this information.

- The System/3X and PC use different 8-bit codes to represent characters. The System/3X uses EBCDIC and the PC uses ASCII.

  Both codes contain letters, digits, and normal special characters. However, a complete one-to-one correspondence does not exist between ASCII and EBCDIC. Because of this mismatch, the following rules should be observed in converting from one character set to the other:

  — When EBCDIC data are converted to ASCII data (File Get function), the space character replaces those characters for which no corresponding code exists.

  — When ASCII data are being translated to EBCDIC (File Put function), nulls (hex 00) replace those characters for which no corresponding code exists.

- Because the PC can handle both smaller and larger numbers than the System/3X, arithmetic rounding occurs when a number sent to a System/3X field has more digits after the decimal than are specified for the field.

  For example, if the System/3X field allows two digits after the decimal point, Table 4-3 shows the rounding convention.

Table 4-3. Rounding in Data Conversion.

PC Number	Resulting System/3X Number
1.125	1.13
1.33333	1.33
3.14159	3.14
0.00007	0.00

If the integer portion of the number does not fit in a System/3X field, an error occurs and the session is aborted.

For example, a System/3X field of length four with two digits after the decimal point does not accept a number greater than 99. Because rounding would cause an overflow of the integer portion of the field, the number is truncated (cut off). For example, rounding the number 99.999 converts to 99.99 because 100.00 does not fit the field.

- Although some PC programs deal with numeric data in the "scientific notation" format — for example, 6.0E+6 meaning 6.0 times 10 to the sixth power, ASTFT11 does not generate numeric data in scientific notation with the File Get function. That is, 6000000 will be transferred as such and not as 6.0E+06.

  However, scientific notation is properly read and converted for such data with the File Put function.

SECTION 5

VIRTUAL DISK INTERFACE

This section describes the AST Virtual Disk Interface (AST-VDI) software. The following topics are covered:

- Introduction — describes what the AST-VDI does. This section includes a description of IBM File Support Utility software.
- Prerequisites — describes what you need in order to use the VDI software.
- Configuring Your PC — describes how to set up your PC so that it recognizes the virtual diskette drive.
- Loading VDI — describes how the VDI software is loaded on the PC.
- Operating the VDI Software — describes how to use the virtual disk interface program.
- Error Handling — describes the types of errors that may occur during VDI operation and what the correct response is.

5.1 Introduction

The AST Virtual Disk Interface allows the AST-5251/11 emulator to take advantage of IBM's File Support Utility (FSU) when the PC is in *emulation mode* (connected to a host computer as a *terminal*). IBM FSU software lets the PC user use a host computer file as if it were a simulated diskette drive on the PC. The simulated diskette drive (located in the host) is known as a virtual disk (or diskette). The virtual disk files (in the host) are images of Personal Computer Disk Operating System (PC-DOS) diskettes and can be used by PC-DOS programs.

The IBM FSU provides these functions:

- Creates, accesses, and deletes a virtual diskette.
- Copies host system files and library source members (or System/38 data base files) to PC files on a virtual diskette.
- Copies PC files from a virtual diskette to a host system file or library source member (or System/3X data base file).
- Translates characters from EBCDIC to ASCII or from ASCII to EBCDIC.
- The VDI software (working in combination with the AST-5251/11 emulator in the PC and IBM FSU software on the host) translates requests that the PC makes to use the virtual diskette (as a normal DOS diskette) into a format that lets you not only connect your PC to the host (act as terminal), but also lets you transfer data back and forth between the PC and the host.

5.2 Prerequisites

Before you can load and use the AST-VDI software, you must have:

- A PC with the AST-5251/11 emulator board installed and with a cable hook-up to the host.
- PC-DOS version 2.0 or later.
- IBM-FSU software correctly loaded on your host. The host system may be an IBM System/34/36/38. Each has its own FSU software. The IBM program product numbers are 5799-BNZ (System/34), 5799-BNY (System/36), and 5799-BKP (System/38).
- A PC diskette with the AST-5251/11 emulation software.
- The proper configuration on your PC (the virtual diskette must be configured on your PC).

5.3 Configuring Your PC

Since the PC accesses the virtual disk as if it were an actual diskette, you must configure the appropriate diskette drive for the PC. The IBM PC and PC-XT use switch settings on the computer's system board to configure the diskette drives. The PC-AT uses Complementary Metal-Oxide Semiconductor Random Access Memory (C-MOS RAM) to store system configuration information. Changes are accomplished through software.

Ideally, you should configure the virtual diskette as a nonexistent drive. For example, if you have a PC-XT or PC-AT with a single diskette (drive A:) and a fixed disk (drive C:), the virtual disk should be set up as drive B:. This will avoid any potential confusion or conflict. However, it's not always possible to configure the virtual disk this way. For example, if you have an PC-XT or PC-AT with two physical diskette drives, drive B: is already "taken". The virtual diskette will still function if you assign it to drive B:. Just remember that you cannot use the real drive B: when the emulator interface and FSU software are running. Also, note that the virtual diskette must be set up as a 360 kilobyte (KB) drive B: (*double-sided*), not as a 1.2 megabyte (MB) drive B: (*high capacity*).

5.3.1 PC Diskette Drive Configuration

Figure 5-1 shows a diagram of the PC system board. The location of the switch for configuring diskette drives is indicated. The switch has eight individual DIP switches numbered 1 through 8. Numbers 1, 7, and 8 are used to determine the number of diskette drives. Refer to your *Guide To Operations* to determine which switches should be set *on* and which should be set *off*.

To avoid possible confusion designate one diskette drive (A,B,C, or D) as the virtual drive (when loading the virtual disk interface software). This diskette will not be used as a physical drive.

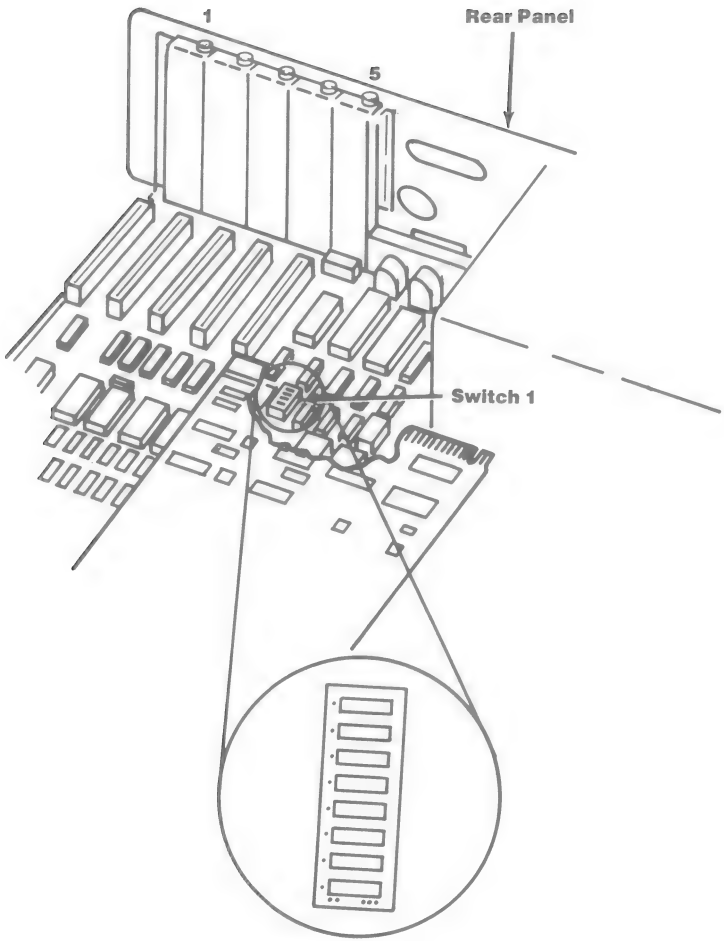


Figure 5-1. System Board Switch Location (PC Only).

5.3.2 PC-XT Diskette Drive Configuration

The PC-XT normally has a single diskette drive (drive designated as A:) and a fixed disk drive (drive designated as C:). Figure 5-2 shows a diagram of the PC-XT system board and the location of the diskette configuration switch. Again, there are eight DIP switches (1-8). To configure a second diskette drive (drive designated as B:) just move DIP switch 7 to the *off* position. That is all you have to do if you are going to install the AST-VDI software with the virtual disk as drive B:.

If you want to install the virtual disk as drive D:, you must also set DIP switch 8 to the *off* position.

5.3.3 PC-AT Diskette Drive Configuration

The diskette drive configuration is done through software on the PC-AT. Refer to your *PC-AT Guide To Operations* and *PC-AT Installation and Setup* manuals for detailed information.

The software for configuring the PC-AT's diskette drives is on the *Diagnostics* diskette in the *PC-AT Guide To Operations*. This program is called *Setup*. Insert the diagnostics diskette into the diskette drive and turn the power on (or reboot if the unit is already on). You will see a diagnostics options menu a shown in Figure 5-3. At the ?__ prompt, key in **4** (SETUP) and press <**Enter**>. This will start the setup program.

The setup program will prompt you to enter questions about your PC-AT's diskette and disk drives and memory. There is a fold-out card in the back of the *PC-AT Installation and Setup* manual that lists the questions and possible answers. The virtual diskette should be installed as diskette drive B:. The virtual diskette used with the PC-AT must be a *double-sided* drive (360 KB capacity), not a *high capacity* drive (1.2 MB capacity). Select the appropriate B: drive. Then, end the setup program. Go back to the diagnostics menu and enter **9** to end diagnostics.

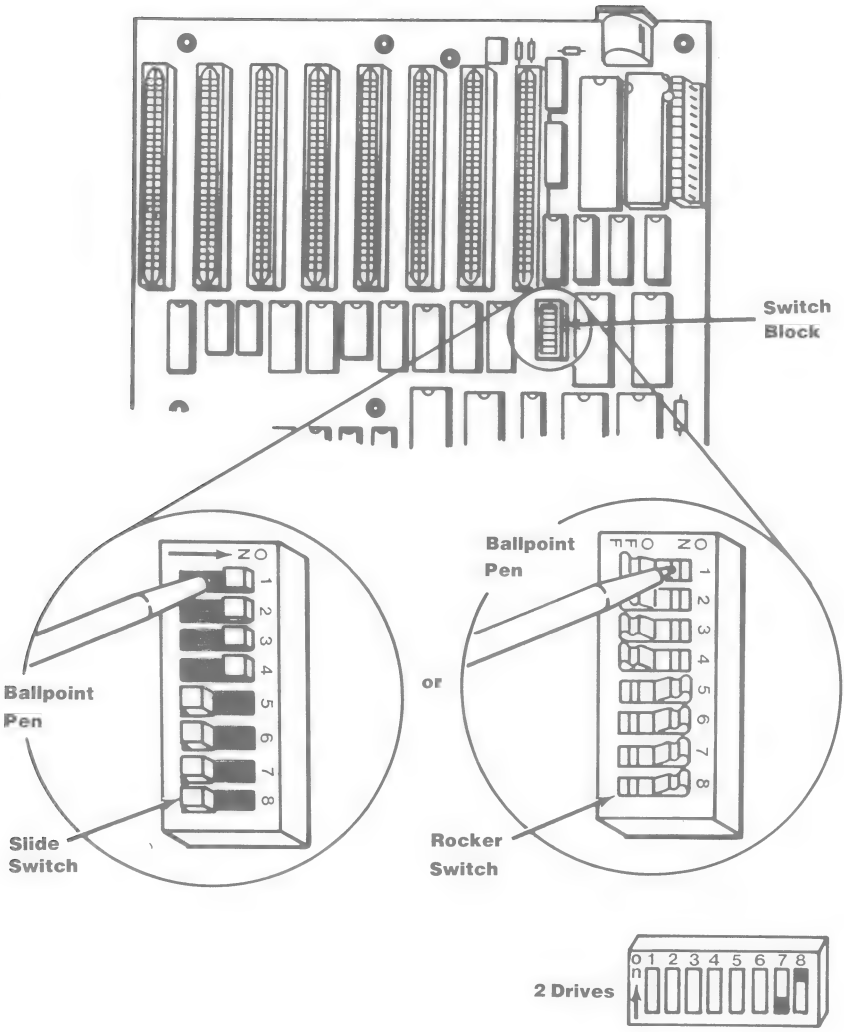


Figure 5-2. System Board Switch Location (PC-XT Only).

NOTE

Set a rocker switch by pressing the rocker down to the desired position.

Your PC-AT is now configured to have an additional diskette drive for the virtual diskette.

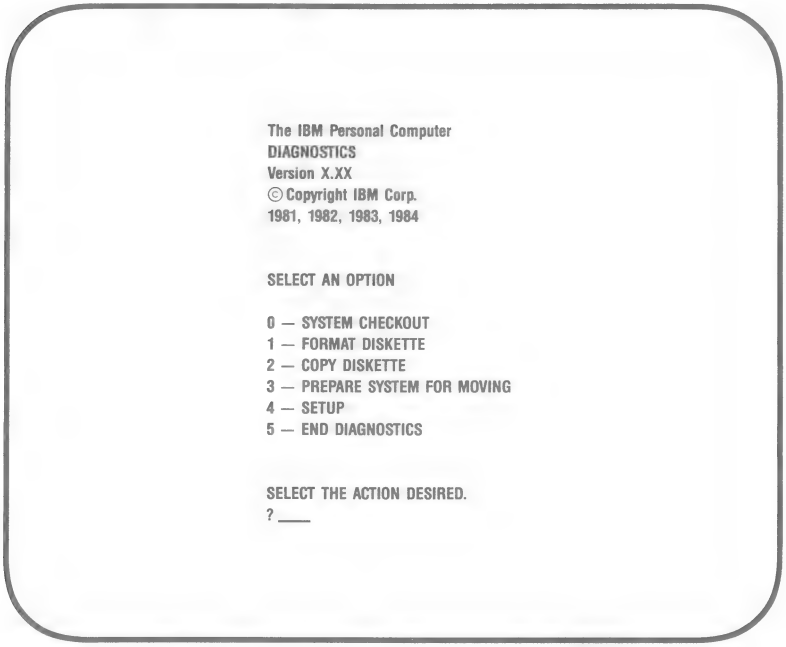


Figure 5-3. PC-AT Diagnostics Options Menu.

5.4 Operating The VDI Software

Once the Virtual Disk Interface has been installed, you must activate the virtual disk on the host computer. This is done by signing on to the host using the PC terminal. To sign on to the host using the PC, you need these three things:

- User ID (not required if host is System/38).
- Password.
- Access to the host library that contains the IBM FSU software.

These items must be set up for you by your host system security operator. Consult your host system operations staff for the required sign-on information.

5.4.1 Setting Up Your Virtual Disk

When you have the AST emulator software installed and running, and you have signed on to the host using the PC, you're ready to set up the virtual disk.

Your screen will show whatever you have signed on to on the host system. For example, you might be at an applications program main menu. Next, you will have to enter the FSU command. On the command line at the bottom of the screen, key in:

PCFSU (if host is an System/34 or System/36)

ENTPCFSU (if host is an System/38)

and press <**Enter**> (host Enter key is Caps Lock).

The Virtual Diskette Options menu will now be displayed. Refer to Figure 5-4. You will have to specify option **2** (create a virtual diskette). Complete the screen and press <**Enter**>. The virtual diskette will be created on the host and you will return to the Virtual Diskette Options menu. Now, select option **1** to attach the virtual diskette for use by your PC. When you return to the menu, press <**Cmd**>-<**7**> to go to the PCFSU menu shown in Figure 5-5.

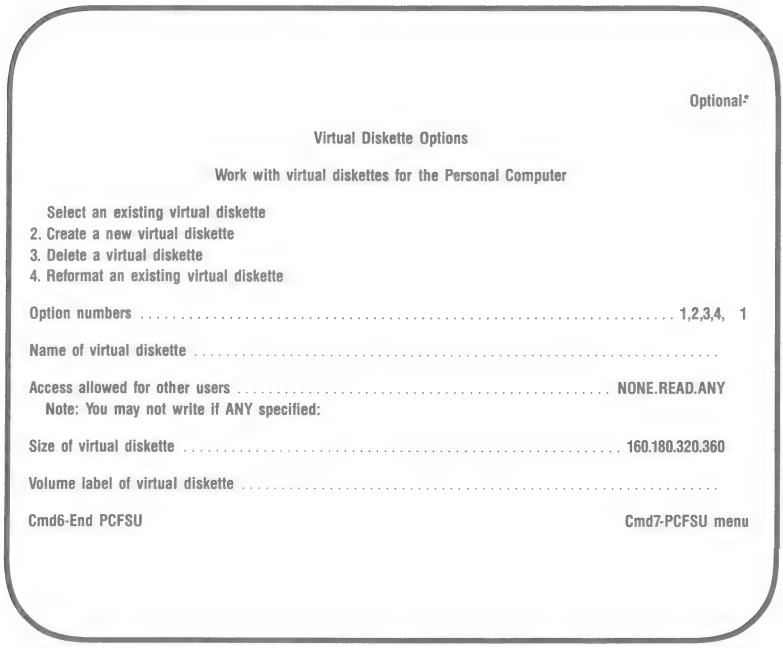


Figure 5-4. FSU Virtual Diskette Options Menu.

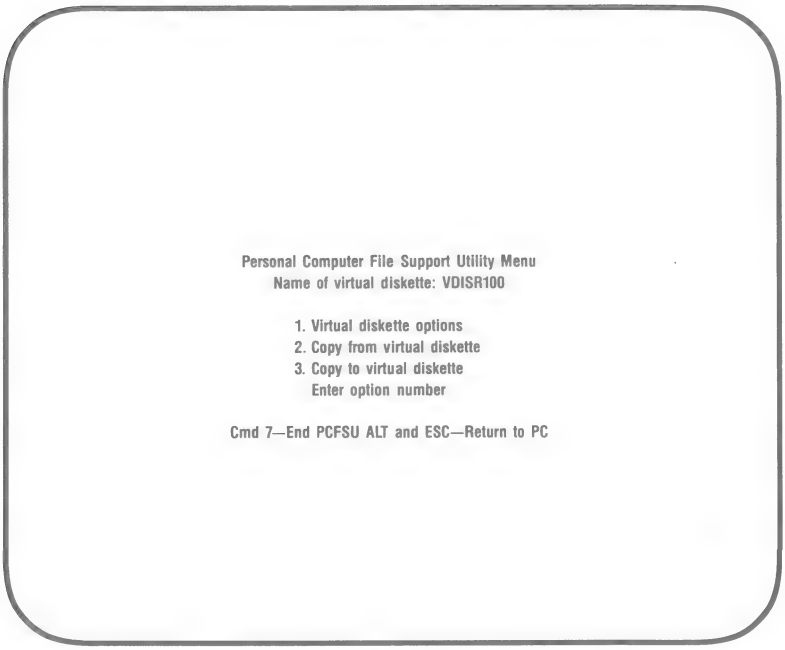


Figure 5-5. Personal Computer File Support Utility Menu.

Now, you can use the *hot key* to go to the PC side for PC processing. You can access the virtual disk as if it were a normal DOS diskette on you PC. Note that your virutal disk remains in the host, even when you detach it from your PC. The next time you want to use VDI, just attach the existing virtual disk. You do not have to create it again. Refer to your *IBM File Support Utility User's/Programmer's Guide* for more detailed information.

Whenever you make a request (DOS command) to write to or read from the virtual diskette, the VDI software will intercept it.

5.4.2 Using VDI

The VDI software will send the request to the virtual disk on the host system. You can use the same DOS operations as you would with an actual diskette. This includes commands to copy, delete, and rename files on the virtual disk. The FSU software on the host also lets you copy files from the host or host libraries to and from the PC (via the virtual diskette). Consult the *IBM File Support Utility User's/Programmer's Guide* for your host for detailed information about transferring files using FSU and the virtual disk. Note that the transfers are accomplished via the PCFSU menu screen.

Once a file has been transferred to the virtual diskette, it is available for use by any PC program or accessible by a DOS command. However, you must be aware of a restriction in the *other direction*. The host system cannot access files in a subdirectory on the virtual disk. Any files on the virtual disk that are to be accessed by the host must be in the root directory.

NOTE

When you write to or read from a physical diskette drive, you can hear the drive motor noise and (usually) see the drive indicator light on. When the virtual disk is being accessed, you will hear a *clicking* sound to let you know that the virtual disk is working.

5.4.3 Exiting FSU Software

When you sign off the host from the PC terminal, you will exit from the host FSU software. When you exit FSU, the AST-VDI software will ignore all requests (such as DOS commands,) made to the virtual disk and transfer them back to DOS for processing. DOS will then attempt to access an actual (physical) drive with the same designation as the virtual drive. If there is no physical drive attached, you will get the following DOS error message and processing will stop.

```
NOT READY READING DRIVE B:
ABORT, RETRY, IGNORE?
```

Respond with **A**, **R**, or **I**, as appropriate.

5.5 Error Handling

When you are processing using the Virtual Disk Interface, an error condition is indicated by a single audible *beep* from the PC. Most of the errors that occur during processing (virtual disk access) are handled by DOS or the host FSU software. Consult your *DOS Manual* and your host *IBM File Support Utility User's/Programmer's Guide* for error messages and corrective actions. Refer to Appendix C in the *AST 5251/11 User's Manual* for host system and emulator error messages.

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APPENDIX A

ERROR MESSAGES

This appendix lists and briefly explains the error messages that may be displayed when using ASTFT11. The messages are listed in numerical order, but are not necessarily continuous.

00 5250 EMULATOR NOT RUNNING

Explanation: The AST/5251-11 emulator has not been or is not now active.

Action: Load 5250 Emulator.

01 ASTFT11 DID NOT ACTIVATE

Explanation: Probably the station was not signed-on to the System/3X before running ASTFt11.

Action: Use the hot-key sequence to get to the System/3X screen. Check whether or not you are signed-on or if error messages are waiting.

Sign-on or clear the error. Then use the hot-key sequence to go back to the PC mode to restart.

02 S/3X COMMUNICATION LOST

Explanation: Communications with ASTFT11 on the System/3X were lost.

Action: Use the hot-key sequence to get to the System/3X screen to determine the problem.

03 OPERATION ABORTED

Explanation: The current file transfer operation was aborted.

Action: Main menu displayed for user re-entry.

10 INVALID USER [ID or PASSWORD]

Explanation: An invalid (undefined) user ID or Password was entered.

Action: Enter the correct data.

11 NAME NOT FOUND

Explanation: The view named is not defined; no such name was found in the directory.

Action: Key in correct directory name.

13 [READ or ENTRY] ONLY

Explanation: The view named only allows the operation specified; READ or ENTRY.

Action: Select Put or Get according to view definition.

14 FILE NOT FOUND

Explanation: The named diskette file was not found (File Put Operation).

Action: Check the directory of the diskette being used.

15 INVALID MEMBER NAME

Explanation: The library member name just entered contained a decimal point or was one of the following reserved words: DIR, ALL, SYSTEM, or NEW.

Action: Correct and re-enter.

18 ENTRY FILE NOT SEQUENTIAL

Explanation: The file specified by an entry-only data view must be sequential and is either direct or indexed.

Action: Edit the view definition on the System/3X. (Systems person must edit the view.)

19 INVALID COMMAND

Explanation: An invalid command was received by the System/3X database program. This is an internal diagnostic error.

Action: Contact Technical Support at AST Research.

20 FORMAT ERROR

Explanation: The entry just made could not be interpreted or illegal characters were entered.

Action: The cursor is positioned at the point in the entry where the error was detected. Correct and re-enter.

21 ILLEGAL FIELD

Explanation: A field number of 0, or greater than the maximum field number, was entered.

Action: Correct and re-enter.

23 INVALID FORMAT

Explanation: The file conversion type suffix entered is undefined, or the format options entered were invalid.

Action: Correct and re-enter.

24 BAD RECORD FORMAT nnn

Explanation: The data record sent to or received from the System/3X is not compatible with that used by the named view.

nnn is a diagnostic error code used internally by ASTFT11. If nnn is greater than 128 and the operation is a File Put, then this error is recoverable using the /X format option.

Action: Check view format versus data format.

25 OVER LENGTH LIMIT

Explanation: The combined length of the System/3X fields used in a record selection of criteria plus 2 for each field exceeded the limit of 256.

Action: Correct and re-enter.

26 BAD PARAMETER

Explanation: A record selection criteria field parameter was inconsistent with that specified in the view; that is, a character field was entered but a numeric field was specified.

Action: Correct and re-enter.

28 READ ERROR

Explanation: A System/3X disk error occured when attempting to read the view directory.

Action: Contact your System/3X operations staff.

29 DISK I/O ERROR nn

Explanation: A System/3X disk error occurred when reading/writing data. For views, the number "nn" is the Record Definition number that specifies the name of the file.

Action: Contact your System/3X operations staff.

30 S/3X FILE(S) NOT FOUND nn

Explanation: A file was not available for use by the named view; the value nn is the Record Definition number that specifies the name of the file.

Action: Contact your System/3X operations staff.

31 LIBRARY ERROR n

Explanation: The error designated by "n" made a library File Put invalid:

n = 1, No space in library for member.
n = 2, No space in library directory.
n = 3, Library is in use by SEU.
n = 4, Member to be replaced does not exist.
n = 5, Member by same name already exists.

32 FILE EMPTY

Explanation: No data exists in the logical file (File Get operation).

Action: Press <**Enter**> to continue.

33 FILE FULL

Explanation: If the operation was a PUT to a data file, the capacity of the file to store data was exceeded.

No data is appended to that System/3X file, and the File Put operation is aborted.

Action: Contact your Systems/3X operations staff and discuss the file capacities needed to support your work.

35 DISK FULL—READY NEW DISK & ENTER DRIVE LETTER (or ESC)

Explanation: The diskette being written to is full and can hold no more data.

Action: You are requested to ready another diskette to hold the additional data. When this diskette is ready, enter the drive letter (A,B,. . .), and the remaining data will be written to a file of the same name on the specified drive.

You may also abort by pressing <**Esc**> and use selection criteria, if applicable, to reduce the amount of data read.

36 DISK IS WRITE PROTECTED

Explanation: The diskette in the selected drive is write protected.

Action: Use correct diskette or remove write protect tab.

37 DISK DRIVE NOT READY

Explanation: The selected drive is not ready.

Action: Either the door is open or no diskette is inserted.

38 DISK MEDIA ERROR

Explanation: Either the diskette is damaged or the drive is faulty.

Action: Check operation using another diskette to verify whether or not the problem is a media problem.

39 RECORD LENGTH ERROR

Explanation: The record length used when accessing a diskette file does not match that defined for the existing file.

Action: Check record lengths.

42 SPREADSHEET FULL

Explanation: During a File Get function with format type 3 (Lotus 1-2-3 format) specified, the end of the spreadsheet was reached.

The limit on the number of columns in the spreadsheet is 230, and the limit on the number of rows is 2048. If a limit is reached, this error message will be displayed, and the transfer will be terminated.

The resulting file can still be loaded by Lotus; however, an error message — "Part of file is missing" — will be displayed.

Action: Resolve according to the particular PC file needs.

50 ERROR! erl/err

Explanation: An unknown error occurred in program ASTFT11.

The parameter "erl" is the line number at which the error occurred and "err" indicates the error type (see BASIC manual for this error message number).

Action: Record error parameters and contact your AST dealer or AST Technical Support regarding this problem.

Retry operation.

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APPENDIX B

ASCII CHARACTER CODE VALUES

This appendix lists the various characters in the ASCII character set and lists the corresponding ASCII decimal value. Because the ASCII codes 0 to 31 are usually used for control functions or communications, an additional column is provided to list the standard interpretations.

Table B-1. ASCII Character Code Values.

ASCII Value	Character	Control Character	ASCII Value	Character
000	(null)	NUL	032	(space)
001	☺	SOH	033	!
002	●	STX	034	"
003	♥	ETX	035	#
004	♦	EOT	036	$
005	♣	ENQ	037	%
006	♠	ACK	038	&
007	(beep)	BEL	039	'
008	◘	BS	040	(
009	(tab)	HT	041	)
010	(line feed)	LF	042	*
011	(home)	VT	043	+
012	(form feed)	FF	044	,
013	(carriage return)	CR	045	-
014	♫	SO	046	.
015	☼	SI	047	/
016	►	DLE	048	0
017	◄	DC1	049	1
018	↕	DC2	050	2
019	!!	DC3	051	3
020	¶	DC4	052	4
021	§	NAK	053	5
022	▬	SYN	054	6
023	↨	ETB	055	7
024	↑	CAN	056	8
025	↓	EM	057	9
026	→	SUB	058	:
027	←	ESC	059	;
028	(cursor right)	FS	060	<
029	(cursor left)	GS	061	=
030	(cursor up)	RS	062	>
031	(cursor down)	US	063	?

Table B-1. ASCII Character Code Values (Continued).

ASCII Value	Character	ASCII Value	Character
064	@	096	
065	A	097	a
066	B	098	b
067	C	099	c
068	D	100	d
069	E	101	e
070	F	102	f
071	G	103	g
072	H	104	h
073	I	105	i
074	J	106	j
075	K	107	k
076	L	108	l
077	M	109	m
078	N	110	n
079	O	111	o
080	P	112	p
081	Q	113	q
082	R	114	r
083	S	115	s
084	T	116	t
085	U	117	u
086	V	118	v
087	W	119	w
088	X	120	x
089	Y	121	y
090	Z	122	z
091	[	123	{
092	\	124	¦
093	]	125	}
094	^	126	~
095	—	127	⌂

Table B-1. ASCII Character Code Values (Continued).

ASCII Value	Character	ASCII Value	Character
128	Ç	160	á
129	ü	161	í
130	é	162	ó
131	â	163	ú
132	ä	164	ñ
133	à	165	Ñ
134	ȧ	166	a
135	ç	167	o
136	ê	168	¿
137	ë	169	⌐
138	è	170	¬
139	ï	171	½
140	î	172	¼
141	ì	173	¡
142	Ä	174	«
143	Å	175	»
144	É	176	▒
145	æ	177	▒
146	Æ	178	▒
147	ô	179	│
148	ö	180	┤
149	ò	181	╡
150	û	182	╢
151	ù	183	╖
152	ÿ	184	╕
153	Ö	185	╣
154	Ü	186	═
155	¢	187	╗
156	£	188	╝
157	¥	189	╜
158	Pt	190	╛
159	*f*	191	┐

Table B-1. ASCII Character Code Values (Continued).

ASCII Value	Character	ASCII Value	Character
192	└	224	α
193	┴	225	β
194	┬	226	Γ
195	├	227	π
196	–	228	Σ
197	+	229	σ
198	╞	230	μ
199	╟	231	τ
200	╚	232	Φ
201	╔	233	θ
202	╩	234	Ω
203	╦	235	δ
204	╠	236	∞
205	═	237	φ
206	╬	238	∈
207	╧	239	∩
208	╨	240	≡
209	╤	241	±
210	╥	242	≥
211	╙	243	≤
212	╘	244	⌠
213	╒	245	⌡
214	╓	246	÷
215	╫	247	≈
216	╪	248	°
217	┘	249	∙
218	┌	250	·
219	▉	251	√
220	▄	252	n
221	▌	253	2
222	▐	254	■
223	▀	255	(blank 'FF')

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APPENDIX C

CHECKLIST — PROBLEM REPORTING

The following checklist provides a means of assembling pertinent information about your AST- 5250FT/11-A product in case you need to call your dealer or AST for technical support. Fill out the checklist before calling so that you will have the information necessary to describe the problem.

You may want to make copies of the checklist so that you can fill one out each time you require technical support. Also, you should have a copy of the host information checklist (Figure 2-1) and the Checklist for Technical Support (Appendix J) from the *AST-5251/11 User's Manual.*

CHECKLIST

1. System/3X person to contact at your site with whom to communicate regarding the installation and view definition of ASTFT11.

   Name:
   Phone: ( )

2. Person contacted at AST for technical support
   Name:
   Date Contacted:

3. Date Acquired AST-5250FT/11-A:
   Version of ASTFT11:

4. Type of PC: IBM PC _____ PC-XT _____
   PC-AT _____ Portable _____
   Other:
   PC-DOS Version:

5. Explain the problem — when and how it occurred.

6. Can the problem be repeated/duplicated by a certain sequence of actions? If so, how?

7. List any error messages displayed that are related to the problem occurrence.

8. If you tried various solutions, explain what you did and give the results.

9. If it is an intermittent problem, track the dates and/or circumstances of occurrences, if possible.

10. List or explain any other pertinent information.

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AST RESEARCH, INC.

Product Comment Form

AST-5250FT/11-A
User's Manual
000702-001A

We appreciate your comments regarding any problems or suggestions related to AST Research products. Please use this form to communicate any observations that you have concerning the improvement of either the product itself or the product documentation provided in this manual.

Submitter Information

Submitter's name:

Address:

Product/Manual Comments and Suggestions

Please mail this form to:

AST Research, Inc.
Attn: Product Marketing
2121 Alton Ave.
Irvine, CA 92714-4992

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